Fiscal Year 1973 Work Program

for

The Department of the Army

Contract DAHC19-73-C-0004

December 1972

HUMAN RESOURCES RESEARCH ORGANIZATION

DEPARTMENT OF THE ARMY
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Chief, Behavioral Sciences Division, OCRD

Fiscal Year 1973

Work Program

for

The Department of the Army

Research and Development in Training, Motivation, and Leadership

December 1972

HUMAN RESOURCES RESEARCH ORGANIZATION

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FOREWORD

I. THE HumRRO PROGRAM OF RESEARCH for the Department of the Army

A. Purposes and Origins of the Research Program

The Human Resources Research Organization (HumRRO) is a nonprofit corporation established in 1969 to conduct research in the field of training and education. It is a continuation of The George Washington University Human Resources Research Office which was established in 1951. HumRRO's general purpose is to improve human performance, particularly in organizational settings, through behavioral and social science research, development, and consultation. HumRRO's mission, in work performed under contract with the Department of the Army, is to conduct research in the field of training, requirements for training devices, motivation, and leadership.

The Department of the Army Work Program of the Human Resources Research Organization (HumRRO) for FY 1973 is prepared in furtherance of Contract DAHC 19-73-C-0004 between the Department of the Army and Human Resources Research Organization (HumRRO) to conduct research in training methods, requirements for training devices, motivation, and leadership as jointly agreed by HumRRO and the Office of the Chief of Research and Development, Department of the Army.

The general goal of HumRRO research for the Department of the Army is to discover, develop, and apply human factors and social science principles and techniques to enhance the efficiency of both training and operational performance of military personnel. The objectives are to develop, for individuals and groups, (1) means for efficient acquisition of required military knowledges and skills, (2) procedures to insure retention of required knowledges and skills, and (3) ways to permit maximum utilization of acquired knowledges and skills in performing military duties.

HumRRO performs its research either at its offices in Alexandria, Virginia, or at such military installations as may be appropriate in view of the nature of the research. At present, HumRRO consists of the corporate and executive offices and supporting facilities, located at Alexandria, Virginia, and seven research divisions: Division No. 1 (System Operations), Alexandria, Virginia; Division No. 2, Fort Knox, Kentucky; Division No. 3, Presidio of Monterey, California; Division No. 4, Fort Benning, Georgia; Division No. 5, Fort Bliss, Texas; Division No. 6 (Aviation), Fort Rucker, Alabama; Division No. 7 (Social Science), Alexandria, Virginia. Divisions No. 2 through 6 are collocated with U.S. Army Human Research Units.

The Chief of Research and Development (CRD), through the Behavioral Sciences Division of the Army Research Office, approves and supervises the HumRRO Army Work Program. The primary Army Regulations related to matters of funding and supervision of the research program are AR 70-6, AR 70-8, and AR 705-5. Proposals for HumRRO research to meet Army human factors needs may be made by any Army agency to CRD.

Commands and agencies that sponsor HumRRO's program include the U.S. Continental Army Command, U.S. Army Combat Developments Command, Deputy Chief of Staff for Personnel, Deputy Chief of Staff for Logistics, U.S. Army Recruiting Command, U.S. Strategic Communications Command, and The Special Assistant for the Modern

Volunteer Army. A sponsor provides advice, guidance, and background data and information applicable to the research effort when requested to do so. The sponsor also designates a point of contact for purposes of coordination and information exchange.

B. Present Status

HumRRO's program for FY 1973 consists primarily of exploratory development and advanced development, divided into four categories of effort: Exploratory Research activities, Work Units, Technical Advisory Service, and Basic Research.

An Exploratory Research effort (ER) is an evaluation of the feasibility of engaging in a major research activity on a particular Army problem. In essence, such an effort is a problem-defining activity in response to a military requirement. It entails a careful exploration of areas likely to contain significant problems on which research is possible, and of related work that may be under way. The product of the ER may be Technical Advisory Service or a Work Unit, or the exploration may indicate that the problem is not suitable or not profitable for further study under HumRRO's mission or facilities. Exploratory Research accounts for 6% of the total FY 1973 program.

The major portion of the HumRRO program consists of the research efforts known as Work Units, which are usually initiated as a result of exploratory research. Work Units are full-scale research projects designed to produce specific information or products aimed directly at an Army problem. They account for 79% of the total FY 1973 program, not including one Work Unit that is listed as a Basic Research effort.

In addition to the exploration of problem areas in Exploratory Research and the conduct of research in Work Units, 5% of the HumRRO effort in FY 1973 is scheduled for Technical Advisory Service (TAS) performed on request. TAS activities are primarily of a consultative nature, and are undertaken either when sufficient information can readily be attained to provide a sound answer to a military problem or when, because of time pressures, the Army urgently needs a "best available" answer. The work of assisting Army personnel in implementing research findings and recommendations is carried on in some instances as part of programed Work Units or Exploratory Research and in some instances as TAS, depending on the stage of the research.

The Basic Research program (BR), which comprises 10% of the FY 1973 effort, deals with selected problems in the psychological and social sciences in which an increase in knowledge would (1) have special application to human factors problems in the military environment, and (2) contribute to the present body of facts and principles bearing upon training.

II. SUMMARY OF THE FY 1973 ARMY WORK PROGRAM

Activities in the HumRRO Work Program for the Department of the Army for FY 1973 have been grouped into six major Research Areas. These groupings, although not definitive or mutually exclusive, serve to indicate the nature of HumRRO work in relation to needs arising in major Army activities; they also serve to emphasize the interrelationships among HumRRO studies.

A tabular summary of the Work Program showing the location, category, and amount of effort in each Research Area is presented in Section III, pages vi-vii. Work Units are indicated by code names, and Exploratory Research and Basic Research problems are identified by numbers. A total of 71.50 "basic man-years" has been allocated to the activities shown in the chart.

The general scope of each Research Area and approximate amount of effort allocated to each are described in the following paragraphs.

Summary of Research Areas

Research Area 1—Individual Training and Performance

Approximately 18% of HumRRO's total effort for the Army Work Program for FY 1973 is allocated to individual training and performance.

Research activities in this Research Area are directed toward the improvement of training of the individual soldier and toward determination of performance requirements for the individual soldier in various military systems. Research on training for the individual soldier includes research relating to Basic Combat Training, Advanced Individual Training, and training for operation and maintenance of equipment. While development or improvement of a particular training program is the type of research frequently performed, the Research Area also includes a variety of related activities, such as study of abilities and skills required of the individual soldier in a particular military system, study of performance under field conditions, study on detection of mines and boobytraps, and research on recruiting.

Research Area 2—Unit Training and Performance

Approximately 1% of HumRRO's total effort for the Army Work Program for FY 1973 is allocated to unit training and performance.

The main emphasis of the research activities in unit training is upon training groups of men to work together effectively in order to attain a designated objective. While training of the group member in individual skills will be given attention as necessary, research efforts in this Research Area will concentrate on selected Army activities that require coordinated group behavior. In addition to work directly related to team-type training, the research will explore ways in which group organization and interpersonal relations contribute to group effectiveness.

Research Area 3—Training for Leadership, Command, and Control

Approximately 4% of HumRRO's total effort for the Army Work Program for FY 1973 is allocated to training for leadership, command, and control.

Research activities in this area are directed toward increasing understanding of human factors aspects of leadership and command, and exploring approaches to officer training. The field of interest includes Infantry leadership at company and battalion levels.

Research Area 4—Area Training

Approximately 1% of HumRRO's total effort for the Army Work Program for FY 1973 is allocated to area training.

The general objectives of efforts in this Research Area are to identify and improve training in skills that are important to success in stability operations in underdeveloped non-Western countries. Research will be conducted to determine the skills, knowledges, and attitudes that are most likely to contribute significantly to success in stability operations. Training techniques to teach these cross-cultural attributes will be designed and tested.

Research Area 5—Training Technology

Approximately 37% of HumRRO's total effort for the Army Work Program for FY 1973 is allocated to training technology.

Many HumRRO research activities make contributions, direct or indirect, to the development of a technology of training, but in this Research Area the Work Units and other research efforts are specifically concerned with the subject of technology. Their objective is to develop general methods for training individuals and groups and for

III. Category and Amount of Effort by Research Area and Location

Research Area	HumRRO Division			
	No. 1 (System Operations)	No. 2	No. 3	No. 4
1 Individual Training and Performance	(BMY) CATB .75	(BMY) CATB 1.00 MBT * NIGHTSIGHTS *		(BMY) CATB 3.00 COUNTERMINE 1.00 DETECT *
2 Unit Training and Performance	(BMY) JOBGOAL .25			
3 Training for Leadership, Command, and Control				(BMY) DECIDE 1.80 FORGE 1.00 OC LEADER .10
4 Area Training				
5 Training Technology	(BMY) ACTS 2.00 CATALIST 11.00		(BMY) FLIT 1.90 BR 21 3.70	
6 Training Management	(BMY) PRISM 2.00 ER 93 1.50	(BMY) ATC-Perform 1.00 COMMUNICATE 1.50 ESPRIT .50 SMMART 2.00	(BMY) ATC-Perform 6.80 VOLAR EVALUATION .20	
TAS	(BMY) TAS .10	(BMY) TAS 1.00	MY) TAS .20	(BMY) TAS 1.10
Percent of Total Effort	25%	10%	18%	11%

BMY Basic Man Years ER Exploratory Research, BR Basic Research TAS Technical Advisory Service

*MACT is administered by the Operations Directorate, HumRRO Executive Office

[b]Excludes Work Unit FORGE which is included in Basic Research

HumRRO Division								Percent of Total Effort
No. 5		No. 6 (Aviation)		No. 7 (Social Science)		Executive Staff		
	(BMY)		(BMY)		(BMY)			
CATB	1.00			RECRUIT	3.00			18%
INTERFACE	1.25							
		ER-92	1.80					
								1%
								4%
					(BMY)			
				COPE	.50			1%
				DEBRIEF	.50			
	(BMY)		(BMY)		(BMY)			
CLASSROOM	.75	SYNTRAIN	3.80					37%
				BR-20	1.50			
BR-16	1.00			ER-84	1.00			
	(BMY)		(BMY)		(BMY)		(BMY)	
ATC-Perform	1.00	PREDICT	2.30	MODE	3.00	MACT[a]	1.00	34%
MODMAN	1.50							
	(BMY)		(BMY)		(BMY)			
TAS	.50	TAS	.40	TAS	.30			5%
18%		11%		14%		1%		Work Units 79%[b] ER 6% BR 10% TAS 5% 100%

ER-Exploratory Research

- ER-92 Human Factors Requirements in Airmobility During Continuous Operations
- ER-93 Strategic Communications Personnel and Training Requirements
- ER-94 Cultural Self Awareness Approach to Training in Interracial Communication

BR-Basic Research (includes Work Unit FORGE in addition to the Basic Research efforts)

- BR-16 Improving Ability to See Military Targets
- BR-20 Design of a New Technique for Changing Racial Attitudes Among Military Personnel
- BR-21 Determining Ultimate Proficiency Levels Attainable by Low Ability Military Personnel

[a] Suspended for work on CATB

maintaining desired performance—methods that would be applicable for a wide range of subject matter and training circumstances. The research deals with both instructor-administered and instructor-free training, and there is special interest in techniques—such as simulation and automated, computer-administered instruction—that might lead to more efficient training, in terms of both time and money. Work on the development of specifications for a computerized training system for the Army is included. There is also interest in ways of improving training effectiveness through improved motivation. The research includes not only the development of techniques suitable for immediate implementation, but also more basic explorations into the learning processes that might lead to marked improvements in future training efforts.

Research Area 6—Training Management

Approximately 34% of HumRRO's total effort for the Army Work Program for FY 1973 is allocated to training management.

Research in this area goes beyond improvements in training content and instructional methods. Activities in this area include research relating to administrative and organizational problems within the training organization. The Research Area includes efforts directed toward necessary modification of training administrative procedures and organizational structure to allow effective introduction of improved instructional procedures.

Technical Advisory Service

Approximately 5% of HumRRO's total effort for the Army Work Program for FY 1973 has been allocated to Technical Advisory Service.

III. CATEGORY AND AMOUNT OF EFFORT BY RESEARCH AREA AND LOCATION (pp. vi, vii)

IV. WORK PROGRAM ELEMENTS BY TASK ORDER (p. ix)

The current contract between HumRRO and the Department of the Army is a Task Order contract—that is, there is an overall contract and then a specification of the work to be done in a series of Task Orders. There are eleven Task Order categories, seven focused on programs of the Divisions, and one each on Computer-Administered Instruction, Basic Research, support of the Military Assistance Command Training Directorate in Vietnam, and performance training in Army Training Centers.

The chart on the facing page shows Task Orders in relation to the work program elements.

V. WORK PROGRAM ELEMENTS BY TECHNOLOGICAL BASE AND APPLIED STATUS (p. x)

VI. SUMMARY OF MAJOR CHANGES FROM FY 1972 ARMY WORK PROGRAM

A. Level of Effort

The FY 1973 HumRRO Work Program for the Department of the Army calls for 71.50 basic man-years.

IV. Work Program Elements by Task Orders

Task Order	Division No. 1 (System Operations)	Division No. 2	Division No. 3	Division No. 4	Division No. 5	Division No. 6 (Aviation)	Division No. 7 (Social Science)	Executive Staff	Total BMY
73-1	(BMY) CATS .75 JOBGOAL .25 PRISM 2.00 ER-93 1.50 TAS .10								4.00
73-2		(BMY) CATS 1.00 COMMUNICATE 1.50 ESPRIT .50 SMART 2.00 TAS 1.00							6.00
73-3			(BMY) FLIT 1.90 VOLAR E .20 TAS .20						2.30
73-4				(BMY) CATS 3.00 COUNTERMINE 1.00 CECIDE 1.90 OC LEADER .10 TAS 1.10					7.00
73-5					(BMY) CATS 1.00 CLASSROOM .75 INTERFACE 1.25 MODMAN 1.50 TAS .50				5.00
73-6						(BMY) PREDICT 2.30 SYNTRAIN 3.80 ER-92 1.80 TAS .40			8.30
73-7							(BMY) COPE .50 DEBRIEF .50 MODE 3.00 RECRUIT 3.00 ER-94 1.00 TAS .30		8.30
73-8	ACTS 2.00 CATALIST 11.00								13.00
73-9			BR-21 3.70	FORGE 1.00	BR-16 1.00		BR-20 1.50		7.20
73-10		ATC-Perform 1.00	ATC-Perform 6.80		ATC-Perform 1.00				8.80
73-11								(BMY) MACT 1.00	1.00
Total	17.00	7.00	12.80	8.00	7.00	8.30	9.80	1.00	71.50

Note: Work Units DETECT (Task Order 73-4) and MBT and NIGHTSIGHTS (Task Order 73-2) were suspended to make available resources for CATB

V. Work Program Elements by Technological Base and Applied Status

Program	Division No. 1		Division No. 2		Division No. 3		Division No. 4		Division No. 5		Division No. 6		Division No. 7		Executive Staff		Total
		(SWY)		(SWY)		(SWY)		(SWY)		(SWY)		(SWY)		(SWY)			
Technological Base Program	CATALIST	11.00	COMMUNICATE	1.50	BR-21	3.70	DECIDE	1.00	BR-16	1.00	PREDICT	2.30	COPE	.50			
	PRISM	2.00	MBT	*			FORGE	1.00	CLASSROOM	.75	SYNTRAIN	3.00	DEBRIEF	.50			
									INTERFACE	1.25			MODE	3.00			
									MODMAN	1.50			BR-20	1.50			
													ER-04	1.00			
Total		13.00		1.50		3.70		2.00		4.50		5.10		6.50			(6.3%) 28.10 (SWY)
Applied Program	ACTS	2.00	CATB	1.00	ATC-Perform	6.00	CATB	3.00	ATC-Perform	1.00	ER-02	1.00	RECRUIT	3.00		(SWY)	
	CATB	.75	ATC-Perform	1.00	FLIT	1.00	COUNTERMINE	1.00	CATB	1.00	TAS	.40	TAS	.30	BACT*	1.00	
	JOBGOAL	.25	ESPRIT	0.50	VOLAR		DETECT	*	TAS	.50							
	ER-03	1.50	NIGHTSIGHTS	*	EVALUATION	.20	OC LEADER	.10									
	TAS	.10	SMART	2.00	TAS	.20	TAS	1.10									
			TAS	1.00													
Total		4.00		5.50		9.10		5.20		2.50		2.20		3.30		1.00	(47%) 33.40 (SWY)
TOTAL		17.00		7.00		12.80		8.00		7.00		8.30		9.80		1.00	71.50

SWY - Scientific Man Years; BR - Basic Research; ER - Exploratory Research; TAS - Technical Advisory Service

*BACT is administered by the Operations Directorate, Executive Office

**Suspended effort diverted to CATB

B. Research Completed in FY 1972

Eighteen Work Units that were originally in the FY 1972 Work Program do not appear in this year's program. Research in 12 Work Units was completed, with final documentation being carried over into FY 73 (APSTRAT, FOLLOWTHRU, MARKSMAN, PREVENT, READNEED, RETURN, SKYFIRE, SKYGUARD, SPECTRUM, STOCK, UTILITY, and VOLAR TRAINING). Four Work Units were terminated during FY 1972, to be replaced by two somewhat redirected Work Units, which have been continued in FY 1973 (COST and MEDIA terminated, replaced by SMMART; JOBLIT and LISTEN terminated, replaced by FLIT). Between FY 1972 and FY 1973, Work Unit IMPACT has been replaced by two new Work Units, CATALIST and ACTS.

Five Exploratory Research efforts that were in the FY 1972 Work Program do not appear in this year's program. Three resulted in Work Units (ER-87 to DECIDE, ER-88 to COUNTERMINE, and ER-91 to CLASSROOM). Two were terminated (ER-89 and ER-90).

C. Research Scheduled for Completion in FY 1973

Eight Work Units are scheduled for completion during FY 1973 (COPE, DEBRIEF, ESPRIT, FORGE, JOBGOAL, MODMAN, OC LEADER, and VOLAR EVALUATION). Three Work Units were scheduled for completion in FY 1973, but work was suspended on them for CATB (DETECT, MBT, and NIGHTSIGHTS).

D. Research to be Initiated in FY 1973

Ten new Work Units (ACTS, ATC-Perform, CATALIST, CATB, CLASSROOM, COMMUNICATE, COUNTERMINE, DECIDE, PRISM, and RECRUIT) and two new Exploratory Research efforts (ER-93 and ER-94) are in the FY 1973 Work Program.

FORMAT OF THE ARMY WORK PROGRAM

Each of the six sections of the FY 1973 Work Program for the Department of the Army describes one Research Area. An introduction (on buff pages) names the Work Units, Exploratory Research efforts, and Basic Research efforts, describes the Research Area in general terms, and states the level of effort for FY 1973

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CONTENTS

EXPLANATORY NOTES

1. Each Research Area is introduced by a summary statement including the scope of the research in the area, amount of effort to be expended in professional, or basic, man-years (BMY), and listings of the various research efforts.

2. Each Work Unit Statement indicates in paragraph 3 whether the Work Unit is a part of the Technological Base Program or the Applied Program. Work Units in the Technological Base Program are expected to yield principles and techniques applicable to Army training generally, or to a substantial segment of Army training. Work Units in the Applied Program are expected to produce a specific product or service for the particular military agency sponsoring that Work Unit. The sponsor provides advice, guidance, and background data and information applicable to the research effort when requested to do so. The sponsor also designates a point of contact for purposes of coordination and information exchange.

3. Each Work Unit Statement includes a Work Sub-Unit summary chart in which the progress of the Work Unit is forecast. Symbols used to indicate the status of work in given fiscal year quarters are:

P = Planning and research design
C = Collection of data or conduct of experiment
A = Analysis of data
D = Draft report preparation and preparation of final report
S = Submission of report to OCRD

An asterisk (*) in the first block of the chart indicates that phases have occurred prior to the beginning of Fiscal Year 1973.

4. Each Exploratory Research statement, in addition to summarizing the military problem area for which feasibility of research will be assessed, indicates the military agencies most directly concerned and the BMY level assigned to the research. Each Basic Research statement gives the psychological or social science problem under study and indicates the BMY level of effort.

Research Area 1:

INDIVIDUAL TRAINING AND PERFORMANCE

Research Area 1:

Individual Training and Performance

Title:

Work Units

Systems Engineering, Test, and Evaluation of Combat Arms Training (CATB)
Training for Mine and Boobytrap Detection (COUNTERMINE)
Detection of Human Targets by the Infantryman in the Field Situation (DETECT)
Simulation and Training Methods for Maintenance and Operation of Advanced Military Electronics Systems (INTERFACE)
Training Guidelines for a Main Battle Tank (MBT)
Training Techniques for New Night Vision Devices (NIGHTSIGHTS)
Research on Recruiting (RECRUIT)

Exploratory Research

Human Factors Requirements in Airmobility During Continuous Operations (ER-92)

Description:

Research activities in this area are directed toward the improvement of training and performance of the individual soldier, and toward determination of performance requirements for the individual soldier in various military systems. Research on training for the individual soldier includes studies relating to Basic Combat Training, Advanced Individual Training, and training for the operation and maintenance of equipment. Specific efforts include the development of training objectives for a Main Battle Tank, studies of the use of night vision devices, study of the detection of human targets by the infantryman, a study of performance under field conditions, development of simulation methods and training aids for electronic maintenance, research on recruiting, as well as exploratory research on human requirements in airmobility. In addition, advice and assistance is being given to the Combat Arms Training Board on systems engineering of combat arms MOSs and testing and evaluating a training extension course and the combat vehicle simulator.

Level of Effort in FY 1973: 12.80 BMYs.

WORK UNIT STATEMENT

1. Systems Engineering, Test, and Evaluation of Combat Arms Training—CATB (New)

2. Location: HumRRO Divisions No. 4, No. 1 (System Operations), No. 2, and No. 5

3. Applied Program. Sponsor: U.S. Continental Army Command

4. Scope:

   a. Objective of Research. Advice and assistance is being given to the Combat Arms Training Board (CATB) on three projects, the titles and objectives of which are as follows:

      (1) Systems Engineering of Combat Arms MOSs (8 MOS). The objective of this project is to complete the first three steps of the systems engineering process (as outlined in CONARC Reg 350-100-1) for eight of the key combat arms MOSs (11B, 11C, 11D, 11E, 13B, 13E, 16P, and 16R) for three levels of tasks: (a) tasks common to all soldiers in the eight MOSs (Fundamentals), (b) tasks common to all soldiers in a given combat arm (Branch), and (c) tasks unique to soldiers in a given duty position (MOS).

      (2) Test and Evaluation of Training Extension Course (TEC). Phase One: The objective is to determine the effectiveness, utilization, and usability of an audiovisual training system as preparation for the MOS 11B40 test. Phase Two: The objectives are to develop a plan for the developmental pretesting of lessons prepared by Army service schools for various audiovisual (still and motion) media and to evaluate the effectiveness of the educational systems in terms of media.

      (3) Evaluation of the Combat Vehicle Simulator (CVS): The objectives are to (a) determine the effectiveness and cost of using a Combat Vehicle Simulator as a means for training troop leaders in mounted command, control, and communications procedures when conditions limit or prohibit the use of tracked vehicles for such training, and (b) compare the cost effectiveness of the CVS as a leader trainer with that of the M151 when used in the same role.

   b. Background. While U.S. Army field commanders have for many years been responsible for the state of training of assigned personnel and units, they have not always had access to the resources and techniques necessary to accomplish these required training tasks. On 30 June 1971, the Chief of Staff of the Army, in an effort to achieve more dynamic training in combat arms units, directed that all detailed training management tasks be decentralized to battalion and lower levels. The directive further emphasized that mandatory subjects prescribed by higher headquarters be eliminated and that training guidance be provided to battalions by mission-type orders rather than by detailed directives.

      In order to develop better support for training, the Chief of Staff of the Army later directed the formation of the Board for Dynamic Training at Fort Benning, Georgia (Gorman Board), to study methods of assisting unit commanders to conduct exciting, meaningful, and rewarding training. The Board investigated several facets of training and identified main problem areas that were obstacles to the development of dynamic training within active Army and Reserve component units. Recommended approaches for solving these problems were

contained in the Board's "Program of Action." One of these recommendations was to establish a permanent organization to implement a program designed to increase professionalism among junior leaders and galvanize training within active Army and Reserve component units. Accordingly, the Combat Arms Training Board (CATB) was established with a three-year charter and the Dynamic Training Board was dissolved 17 December 1971. In accomplishing its role, one of CATB's primary missions is to develop and place into action new and innovative concepts designed to increase the training proficiency of active Army and Reserve component units.

Specific background information for each of the three projects follows:

(1) 8 MOS. The Board for Dynamic Training found that personnel responsible for training combat arms soldiers needed assistance in increasing the proficiency level of NCOs, that trainers at the unit level had neither the methodologies nor the materiel to conduct adequate training, and that combat arms soldiers indicated that their opportunities for professional development were limited. Limiting factors identified included the following: (a) Many study references are difficult to read and understand, (b) very little MOS instruction is conducted in the units for the NCO, and (c) the MOS tests that determine a soldier's future are sometimes inappropriate. Although the NCO Educational System programs currently being developed should solve many aspects of this problem, the extensive backlog of students will seriously delay any substantial increase in overall NCO proficiency.

The Combat Arms Training Board (CATB) felt that the first step in solving the problem should be the simultaneous systems engineering of key combat arms MOSs. It was also felt that this systems engineering effort should take advantage of the task commonalities that exist between various duty positions in the combat arms. The training for combat arms soldiers could be made more efficient if the training for common tasks is developed by a single proponent. For tasks that are common to the majority of combat soldiers or to certain groups of soldiers, the training materials could be produced once rather than several times by different combat arms trainers.

(2) TEC. A fundamental problem that has perennially confronted unit commanders is the requirement to conduct individualized instruction within the unit, in order to insure that assigned personnel have adequate levels of skill to perform unit missions. A conceptual approach that addresses this problem envisions the use of individualized instruction that can be administered at unit level by multi-media means, such as programmed texts and audio-visual devices (both motion and still). The concept is titled the Training Extension Course (TEC) and involves branch school support for training within units. Courses of instruction suitable for presentation using multi-media equipment and programmed learning techniques are to be developed by U.S. Army branch schools and distributed to troop units. Thus, the concept is designed to (a) assist small-unit commanders in providing MOS proficiency training to personnel in their units, (b) provide small-unit trainees with direct access to the training expertise that exists in the Combat Arms Schools, and (c) provide the individual soldier with ready access to relevant, effective, and interesting audiovisual self-paced instructions in MOS proficiency subjects.

(3) CVS. One of the problem areas investigated by the Gorman Board was that of the constraints placed upon the use of tracked vehicles for the conduct of realistic training. There are Armor and Mechanized units, in both the the active Army and Reserve components, that are unable to use their vehicles for training because they do not have ready access to maneuver areas that are suitable for mounted training with tracked vehicles. Maneuver damage costs also restrict training, in that during field exercises armored and mechanized units fearing excessive damage to property are forced into unrealistic deployment. The result of these constraints is infrequent training in those aspects of mounted command, control, and communications that are vital to the combat readiness of highly mobile units.

The Board, in an effort to provide a means for conducting mounted leader training under the constraints associated with the use of tracked vehicles, conceived the use of lightweight, low ground pressure, all-terrain vehicles as simulators for tracked vehicles, such as combat vehicle simulators (CVS).

c. Method of Attack.

(1) 8 MOS. This project will use CONARC Reg 350-100-1 as the basic reference and guide for developing materials. The use of this regulation will be supplemented with numerous trips and coordination meetings to insure that all personnel working on the project have the same frame of reference. In order to produce a uniform product that will include tasks common to soldiers across the combat arms, it is important that the input from the various groups be as homogeneous as possible.

(a) Participants. This project will require a high degree of coordination between various working groups. The primary working group will be a military staff assembled at each of the combat arms schools. HumRRO personnel from Divisions No. 2, 4, and 5 will advise and consult with each military group at the combat arms schools. CATB and HumRRO Division No. 4 will direct and coordinate the entire effort.

(b) Job Identification. Job identifications will be developed for 94 different duty positions. There are 22-28 duty positions in each of the combat arms. The selection of specific duty positions will be based upon density and criticality of the positions. HumRRO Division No. 4 will develop the initial job identifications and the combat arms schools will review, revise, and finalize these materials.

(c) Task Inventories. A complete task inventory will be developed for each of the 94 duty positions. During the development of the inventories, a category system will be used as an administrative tool to permit comparison of material from different groups. Tasks will be identified for categories such as First Aid, Land Navigation, and Tactics. Within each category, tasks will be identified at three levels (Fundamental, Branch, MOS). Mission profiles will be utilized during the review and revision of task inventories to ensure that the tasks are relevant. It will be necessary to obtain agreement from representatives of each of the combat arms concerning statements for Fundamental tasks.

(d) Validation. The task lists developed for each duty position will be validated by three different groups of subjects. Questionnaires for each duty position will be given to job incumbents, senior NCOs, and officers. Job incumbents will be asked whether they perform each task and also if they should be able to perform each task. The senior NCOs and officers will be asked whether personnel in given duty positions should be able to perform each task. For each duty position, a total of 10 subjects will be required for each of the three groups. Following the analysis of the data collected for validation, each task will be examined to determine whether it should be addressed in reference manuals, training materials, evaluation items, or omitted.

(e) Job-Task Data. Job-task data (subtasks, job conditions, job standards, knowledges, skills, and attitudes) will be developed for all tasks that should be performed by 30% or more of the job incumbents. These data will be developed for Fundamental, Branch, and MOS task statements. Agreement will be obtained from representatives of each of the combat arms that the material developed for Fundamental tasks accurately and adequately satisfies their needs. The job-task data for all three levels will then provide the basis for developing training objectives, reference manuals, evaluation criteria, and MOS test questions.

(f) Learning Analysis. During this phase, training objectives and evaluation criteria will be derived from the job-task data. The knowledges and skills for each training objective will be examined to determine the most effective method of presentation, medium, and course design for providing the student with these enabling objectives.

(g) Army Wide Validation. One of the products of the 8 MOS studies will be a list of tasks that are common to the majority of the soldiers in the 8 MOSs. Training and reference materials will be developed for these common tasks under the title "Fundamentals of Soldiering." The concept for the "Fundamentals of Soldiering" is that these training and reference materials would be appropriate for all soldiers in the Army. The efficiency of Army training will be considerably increased if the training for common subjects can be developed once by a single proponent. Before training and reference materials can be developed for the "Fundamentals of Soldiering," however, it must be determined that the tasks providing the basis for these materials are performed by the majority of the soldiers in the Army.

In general, this validation will be conducted during FY 74 in the same manner as the validation of tasks for the 8 MOS studies. The scope of this validation, however, will include all MOSs in the Army.

Questionnaires will be administered to training managers to determine areas of training needs. In conjunction with the results of the validation, training information will be used to establish a rank order of the tasks based on criticality. This rank order will then be used to select tasks for training, select tasks for development in reference materials, or omit tasks.

The entire sequence of events described above will be repeated in FY 74 for an additional 8 MOSs. These MOSs will be selected in terms of criticality and density. When this study is completed, a total of 16 of the combat arms MOSs will have been systems engineered.

(2) TEC. The research and development effort required to establish the feasibility and practicability of using audiovisual education systems within Army field units will proceed in the following two phases:

(a) Phase I. In this phase, effort will be directed toward determining the effectiveness, utilization, and usability of an audiovisual training systen as a means of preparation for the MOS 11B40 test. Conceptually, the program involves development of a test and evaluation program designed to assess the effects of innovative training on performance. For analytical purposes, the primary data will be effectiveness as measured by MOS test performance.

Data will be obtained from five sources: Enlisted Evaluation Center (EEC); CATB Monitors; Human Research Unit (HRU) Data Collectors; TEC Project Officers; and Key Personnel from those Units using TEC. First, 11B40 MOS Test Scores will be obtained from EEC for each participant in the TEC Test and Evaluation Program. Second, CATB monitors will visit the TEC battalions in order to record progress and to describe unanticipated events that might affect the results of the Test and Evaluation Program. Third, HRU will provide a team of data collectors that will be responsible for collecting measures of verbal ability for each participant in the TEC Test and Evaluation Program. Fourth, each participating unit will provide a TEC project officer who will keep a log of (1) software modification, (2) other uses of hardware, (3) down time and meantenance, and (4) modes of presentation for each participant for each time he uses each lesson. Fifth, designated key personnel at all levels will complete questionnaires designed to help them describe and evaluate the TEC experience.

However, effectiveness will also be estimated by evaluations from key personnel at all levels of involvement. In addition, the test and evaluation program will include consideration of more subjective and less direct indications of value: usability and utilization of the TEC materials and media. These latter indications of value will be derived from reports made by the users, TEC project officers, CATB monitors, and HRU data collectors.

(b) Phase II. In this phase, a plan will be developed that will provide for the developmental pretesting (validation) of lessons prepared by Army service schools and designed for use in the various audiovisual media to be used by participating units. Planning will include a determination of the populations to be sampled. In addition, provisions will also be included within the overall plan for means of evaluating the innovative TEC systems.

In the validation process, appropriate groups of individuals will be selected to undertake training using audiovisual equipment and software materials relevant to their MOS. Upon completion of the training, learning retention will be measured. Careful consideration will be given in the selection of personnel within these groups to ensure that they will not be in the final target population for training.

In evaluating the program, efforts will be directed toward several comparisons between the various systems: (1) The performance of individuals in each group under the different study modes will be compared (differences in scores across the different modes would be related to influencing characteristics such as VE or AR scores, motivation, or educational background). (2) A questionnaire will be administered to subjects participating in the program (the questionnaire would ascertain which media the individual preferred and reasons therefore). (3) A questionnaire will be administered to key commanders, small-unit leaders, and staff officers (this will provide leaders and planners participating in the project an opportunity to voice their opinions regarding the various media). (4) In addition, every feasible use of the training devices will be investigated and documented for evaluation by participating units.

(3) CVS. The CVS will be integrated into the training programs of Armored and Mechanized units within the active Army and Reserve components. The vehicle will be used by these units as a means of training troop leaders in mounted command, control, and communication procedures. The evaluation of the effectiveness of the CVS will be based upon the professional judgment of commanders and small-unit leaders who have participated in or observed training with the CVS. The actual cost of using the CVS as a training device will be determined by recording in a log book all operational and maintenance costs associated with the operation of each vehicle. The cost associated with use of the CVS as a training device will be compared with available cost data on the M151 when used in the same training role. A comparative analysis of M151 and CVS training will be conducted by troop units during the conduct of the CVS test. Final determination of the effectiveness of the two vehicles as leader trainer devices will be based on the professional judgment of commanders and troop leaders who have experience with both vehicles.

5. Estimated Professional Man-Years Required:

FY 73: 5.75

FY 74: To be determined

6. Interested Agencies:

U.S. Army Combat Arms Training Board
U.S. Army Infantry School
U.S. Army Armor School
U.S. Army Field Artillery School
U.S. Army Air Defense School
U.S. Army National Guard
U.S. Army Reserve
U.S. Army Combat Developments Command
U.S. Army Materiel Command

7. Work Sub-Unit Forecast:

I. System engineering of Combat Arms MOSs (8 MOS)

FY 73				FY 74			
1	2	3	4	1	2	3	4
PC	CA	AD	S	PC	CA	AD	S

II. Test and evaluation of Training Extension Course (TEC)

FY 73				FY 74			
1	2	3	4	1	2	3	4
PC	C	CAD	DSP	P	C	AP	S

III. Evaluation of the Combat Vehicle Simulator (CVS)

FY 73			
1	2	3	4
PC	CA	CA	DS

WORK UNIT STATEMENT

1. Training for Mine and Boobytrap Detection—COUNTERMINE (New)

2. Location: HumRRO Division No. 4

3. Applied Program. Sponsor: U.S. Continental Army Command

4. Scope:

   a. Objective of Research. To develop training methods that can be used to augment the supply of personnel who are capable of unaided mine and boobytrap detection.

   b. Potential Military Research End-Result. If an improved basis can be developed for training personnel to detect mines and boobytraps, substantial benefits would accrue to combat units. In addition, information generated by this research can be used to improve doctrine, and as input for computer simulations.

   c. Background. Casualty-producing devices such as mines and boobytraps are part of the arsenal of weapons that both conventional and insurgent forces employ in both defense and offense. These devices can inflict serious casualties and may impair the individual soldier's psychological capacity to respond appropriately during a military operation.

      Data collected by HumRRO in 1968 indicated that, in Vietnam during 1967, approximately 33% of the casualties sustained by the units interviewed were from contact with mines and boobytraps. Infantry units suffered most of their casualties from boobytraps, while engineer, armored cavalry, and mechanized units suffered most of their casualties from contact with mines. It seems likely that mines and boobytraps will continue to be used; thus, a need exists to develop training methods that can be used to augment the supply of personnel capable of unaided mine and boobytrap detection.

      During the latter part of FY 72, in Exploratory Research 88, Countermine and Boobytrap Training, HumRRO studied the feasibility of identifying the essential perceptual and cognitive tasks in the process of mine and boobytrap detection. The research plan involved collecting data from testing and interviewing personnel who were expert mine and boobytrap detectors, and from comparison personnel who were not experts. Analysis of the data showed that only two of the several perceptual and cognitive variables studied were related to detection expertise as this was defined in the Exploratory Research.

   d. Method of Attack. The results of the Exploratory Research, while not encouraging with respect to the identification of psychological and cognitive variables related to mine and boobytrap detection expertise, did indicate that this task was sufficiently complex to warrant the development of improved training for personnel in this area. To this end, a systems engineering effort is planned for several courses in mine and boobytrap detection. Each course will reflect a different theory concerning the optimal way to attain the terminal training objectives that will be developed.

      Subsequent to their development, the several mine and boobytrap detection training methods will be implemented, using groups of combat-naive soldiers

as subjects according to a 2 x 2 factorial experimental design. The first between-subjects variable will be the training method employed (Method A vs. no training, Method B vs. no training, etc.); the second will be extent of pre-instructional detection performance assessment (assessment vs. no assessment). After training, the subjects will be given a post-instruction field criterion performance test.

Using this method, it will be possible to validate the training procedures and provide information concerning the nature of the mine and boobytrap detection task.

5. Estimated Professional Man-Years Required:

FY 73: 1.0
FY 74: 1.0

6. Interested Agencies:

U.S. Army Infantry School
U.S. Army Engineer School
U.S. Army Mobility Equipment Research and Development Center
U.S. Army Materiel Command Systems Analysis Agency
U.S. Army Combat Developments Command Engineer Agency
U.S. Army Combat Developments Command Infantry Agency

7. Work Sub-Unit Forecast:

1. Development of training methods for detection of mines and boobytraps:

FY 73				FY 74			
1	2	3	4	1	2	3	4
P	C	CA	AD	AD	D	D	S

Suspended; effort diverted to CATB

WORK UNIT STATEMENT

1. Detection of Human Targets by the Infantryman in the Field Situation—DETECT (Continuing)

2. Location: HumRRO Division No. 4

3. Applied Program. Sponsor: U.S. Continental Army Command

4. Scope:

   a. Objective of Research. To describe and quantify significant factors affecting the ability of individual members of small infantry units to detect human targets.

   b. Potential Military Research End-Result. This research should produce:
      (1) Data relating detection time to environmental, target, and observer variables.
      (2) Data relating accuracy in range estimation to environmental, target, and observer variables.

   c. Background and Summary. Compelling reasons exist for determining what factors affect target detection and range estimation performance. Such data are needed for studies involving ground combat weapons systems (to include the Army Small Arms Requirements Study III. A search of existing literature showed there was a lack of satisfactory target detection data for individual soldiers and small infantry units.

      In FY 71, HumRRO Technical Advisory Service produced findings similar to those in a report by the Ohio State University Systems Research Group that terrain complexity, target speed, and target distance affect detection times. However, HumRRO's research showed that the probability distributions for tank detection are different from those for human target detection.

      During FY 72, Work Unit DETECT extended the research to include the probable effects of target-background contrast and levels of general visibility. These significant variables (terrain complexity, target speed and distance, target-background contrast, and general visibility) and others were field tested and the results were incorporated in the modeling effort (BATTLE Model) of ASARS II. This computer simulate will include a target acquisition subroutine that will describe these significant variables and their interactions.

      The interactions among the significant determinants of detection probability have not been adequately field tested. DETECT and the ASARS BATTLE Model are each concerned with bringing together the data generated by the various target detection tests and activities in order to describe the effects of these significant determinants of detection probability when these variables are operating concurrently (interacting). While these data are empirically generated (*a posteriori*), the modeling effort, in which diverse data are being brought together, is being logically generated (*a priori*). The model, although constructed with technical precision from data that were carefully collected in field experiments, is still a best logical *estimate*, and the target detection and acquisition relationships described need to be examined empirically. Work Unit DETECT will provide this empirical examination.

d. FY 73 Projection. The ASARS II BATTLE Model target acquisition subroutine will be field tested (validated). That is, the predicted interactions among variables will be empirically evaluated. A serial experiment involving human target detection will be designed and conducted. Field data will be assembled and reported to facilitate the use of data in modeling, in training development, and in validating the BATTLE Model.

5. Estimated Professional Man-Years Required:

FY 73: Suspended

6. Interested Agencies:

U.S. Army Infantry School
U.S. Army Combat Development Command Armor Agency
U.S. Army Combat Development Command Infantry Agency
U.S. Army Combat Development Command Systems Analysis Group

7. Work Sub-Unit Forecast:

1. Detection of human targets as a function of environmental, target, and observer variables:

FY 73			
1	2	3	4
*P	C	A	ADS

WORK UNIT STATEMENT

1. Simulation and Training Methods for Maintenance and Operation of Advanced Military Electronics Systems—INTERFACE (Continuing)

2. Location: HumRRO Division No. 5

3. Technological Base Program

4. Scope:

   a. Objectives of Research. To develop a methodology for determining appropriate characteristics of low-cost simulation devices and training aids for use in Air Defense systems and to develop effective training methods for use with the simulators and other job aids which minimize cost and increase the effectiveness of available instructional staff.

   b. Potential Military Research End-Result. The procedures and methods developed in this research will permit Army Schools to develop training programs that require a minimal amount of actual equipment, yet provide for effective performance in the job environment. As a result, the cost of the training will be reduced and the practical skills of the men will be augmented.

   c. Background and Summary. As technology has progressed, correspondingly more complex electronics have been used in Army weapons systems. The cost of such systems has increased drastically, and as a result, the availability of such systems for training purposes has been reduced. The time that can be allotted to the individual soldier for practice on actual equipment has been correspondingly reduced. Hence, a need for lower cost training devices and associated training methods has become apparent.

   The Low Altitude Air Defense Department of the U.S. Army Air Defense School requested that HumRRO determine the feasibility of conducting a research program for developing methods of training with low-cost simulation. HumRRO responded by initiating Exploratory Research 82, Low-Cost Simulation in Military Training, in FY 71. The exploratory work also highlighted the potential of self-directed learning activities to supplement the guidance of instructors. Another important aspect is the integration of training, by which the hardware simulation, the Technical Manuals and other printed job aids, and the task guidance are systematically related.

   A requirement from the High Altitude Missile (HAM) Department involved difficulties with training and use of the computation form for the Nike-Hercules surface-to-surface problem. The difficulties are made more severe since the computations are often performed at remote stations long after training, and sometimes by people who have not had the training.

   A requirement from the Safeguard Central Training Facility (SAFCTF) further indicated the need for training methods that did not involve actual equipment. Because of high costs and the resultant nonavailability of equipment, much of the training, at least in initial stages, will be conducted with low-cost simulators similar to the one HumRRO developed for their equipment in Work Unit MANICON. SAFCTF has requested HumRRO aid with simulator

design and training methods. Similarly, in the SAM-D system development, it is necessary to make judgments as to desirable level of fidelity and other features of training devices and methods.

d. FY 73 Projection. Further research on the types of tasks most amenable to training through simulation and self-directed learning activities will be conducted. Also, research will be conducted to determine the most appropriate methods of training for various types of simulation. The Work Unit will be oriented toward deriving sets of principles that will be widely applicable, so that other training establishments can take advantage of the results. Special attention will be given to the implementation of the principles in Safeguard training.

The work with Hawk has been differentiated into operator (TCO trainer) and maintenance training. The TCO trainer development, including training aids, methods, and validation will first be reported in a consulting report or Instructor's Manual. The exemplary developments for maintenance training will culminate in a consulting report on the Practical Exercise (PE) instructor and the system in which he operates, and how he might better use simulation techniques and other training strategies. For the Nike-Hercules surface-to-surface problem, a new computer form will be designed, the accompanying tables and monograms reengineered, and the relevant chapter in FM 44-82A rewritten, all as a coordinated system, using several innovations in communication technology. These and many other developments in this work unit will be summarized in a manual on simplifying written instructions.

For the Safeguard system, a trainer design will be provided. Appropriate training techniques will be developed. Training and console design plans for the SAM-D system will be reviewed in light of past and current research.

5. Estimated Professional Man-Years Required:

FY 73: 1.25
FY 74: 1.25

6. Interested Agencies:

U.S. Army Air Defense School
U.S. Army Air Defense Command
U.S. Continental Army Command
U.S. Army Combat Development Command, Air Defense Agency
U.S. Army Security Agency

7. Work Sub-Unit Summary and Forecast:

1. Development of training module for Hawk Tactical Control Officer:

FY 73

1	2	3	4
*A	A	D	S

II. Development of Hawk maintenance training methods:

	FY 73				FY 74		
1	2	3	4	1	2	3	4
*A	C	C	C	A	A	D	D

III. Development of computation system, including training, for the Nike-Hercules Surface-to-Surface Mission:

	FY 73				FY 74		
1	2	3	4	1	2	3	4
*C	C	A	A	D	A	A	D

IV. Development of training methods for Advanced Air Defense Systems (Safeguard and SAM-D).

	FY 73				FY 74		
1	2	3	4	1	2	3	4
P	P	C	C	A	A	D	S

Suspended; effort diverted to CATB

WORK UNIT STATEMENT

1. Training Guidelines for a Main Battle Tank—MBT (Continuing)

2. Location: HumRRO Division No. 2

3. Technological Base Program

4. Scope:

   a. Objective of Research. To develop training guidelines required by the personnel responsible for the development of programs for operator training and user maintenance training on a future Main Battle Tank (MBT).

   b. Potential Military Research End-Result. This research will contribute to the definition of:
      (1) Human performance data base required for evaluating weapon system performance requirements and specifying required MOS structures.
      (2) Training objectives and standards for School, Center, and Unit training program planning.
      (3) Training methods and material concepts for unique School, Center, and Unit training requirements.
      (4) Materials and methodology for evaluating the effectiveness of new training program methods and devices.

   c. Background and Summary. Because conceptual studies for a future Main Battle Tank are being directed toward markedly new equipment concepts, training demands cannot be forecast from experience with existing equipment. Therefore, research into the formulation of training guidelines for an MBT was undertaken to assure an adequate determination and evaluation of the skill requirements and the training methods and material concepts necessary for timely training program development. In addition to descriptions of crew tasks for the M-60A2 and the M-551, preliminary task descriptions for crew operation and maintenance of the XM-803 were developed for use by program developers in determining unique training requirements. Crew task descriptions for an MBT were integrated into functional performance units, and the derivation of prototype training objectives was undertaken.

      A definition was established of the human performance data base required for evaluating weapon system performance requirements. This definition encompassed specific items to be included in a training package for the Operational Service Test (OST) that would permit an effective evaluation of training capability before the equipment is used in the field. Guidance for the preparation of training objectives as part of the training package was formulated in conjunction with the derivation of specific gunnery training objectives. These tasks were assigned a high priority to ensure the timely integration of the training package concept into the Army weapon systems development cycle.

      To assist planners in formulating maintenance manpower utilization and training strategies appropriate to the sophisticated hardware that is foreseen in new MBT concepts, research was undertaken to study the potential effectiveness of simplified job aids as supplements to, or substitutes for normal mechanics training in component replacement and repair. An experiment was started in which three

versions of a pictorial guide were compared with the technical manual as aids to the turret mechanic in performing selected organizational maintenance tasks. This study was part of a larger effort of assistance to the turret mechanics school at Fort Knox in order to meet additional training demands incurred by new and more complicated turret systems.

In addition, technical assistance has been provided to the U.S. Army Combat Developments Command (CDC) MBT Task Force in conceptualizing personnel and training requirements based on the body of data from earlier phases of this Work Unit.

d. FY 73 Projection. The study of experimental job aids for selected organizational turret mechanic tasks will be completed, and the report of this study will contain guidelines for the effective use of such job aids in alleviating maintenance training demands.

Technical assistance to the CDC, MBT Task Force will be continued as requested.

5. Estimated Professional Man-Years Required:

FY 73: Suspended
FY 74: 0.5 (To finish suspended work)

6. Interested Agencies:

Office of the Deputy Chief of Staff for Personnel, Department of the Army
Office of the Assistant Chief of Staff for Force Development, Department of the Army
U.S. Continental Army Command
U.S. Army Materiel Command
U.S. Army Combat Developments Command
U.S. Army, Europe
U.S. Army Logistics Doctrine, Systems and Readiness Agency
U.S. Army Human Engineering Laboratories
U.S. Naval Training Device Center

7. Work Sub-Unit Summary and Forecast:

I. Job analysis for operation and organizational maintenance:
   a. Operation: Completed.
   b. Organizational maintenance: Completed.

II. Identification of prototype training objectives, methods, and concepts for material:
   a. Organizational maintenance training:

FY 73

1	2	3	4
*CA	DS		

III. Assistance in training program planning and evaluation:
To be determined.

Suspended; effort diverted to CATB

WORK UNIT STATEMENT

1. Training Techniques for New Night Vision Devices - NIGHTSIGHTS (Continuing)

2. Location: HumRRO Division No. 2

3. Applied Program. Sponsors: U.S. Army Combat Developments Command
U.S. Continental Army Command

4. Scope:

   a. Objectives of Research. To identify critical human factors problems in the use of new night operations devices, and to develop effective techniques for training in the use of the devices.

   b. Potential Military Research End-Result. The advent of night vision devices has given the Army increased operational scope, but the new devices and doctrinal changes have created human operator problems. The research should produce: (1) more specific data on relationships between use of night operations devices and the visual performance characteristics and limitations of the human operator; (2) techniques for extending present operator limits through training; (3) firmer knowledge of target acquisition and engagement methods under darkness with night operations devices; (4) techniques for using night operations devices for surveillance and mobility in conjunction with artificial illuminants; (5) realistic training programs for using night operations devices.

   c. Background and Summary. Attention has been directed toward (1) broadly assessing the impact of image intensifiers from a human factors standpoint, (2) measuring some behavioral effects associated with loss of dark adaptation, and (3) developing prototype training materials for specific devices.

   In NIGHTSIGHTS I, information was obtained on the dark adaptation recovery time needed for effective cross-country movement after use of an intensifier, and on the ability to return fire on a silhouette target after using an intensifier. In NIGHTSIGHTS II, the effects of factors that influence the course of dark adaptation were studied.

   NIGHTSIGHTS III was a survey of problems in the tactical employment of night viewing devices. Two general areas requiring further research were identified: the viewing problems arising from the optical characteristics of image intensifiers and the problems found during tactical employment of the devices.

   In NIGHTSIGHTS IV, prototype training materials and methods were developed for a number of representative night operations devices in the SEA NITEOPS program. Research on the cost effectiveness of training methods developed for SEA NITEOPS was begun in NIGHTSIGHTS V. After development of preliminary lesson plans for a representative night operations device, work was postponed because night-viewing equipment was not available.

   In NIGHTSIGHTS VI, study of visual factors limiting the use of night observation devices was begun. Information was obtained on the effects of information load, target location in the field of view, and observation strategy on the target contrast and exposure time necessary for target detection and recognition.

d. FY 1973 Projection. Work Unit NIGHTSIGHTS will be completed during FY 73.

Original research plans for NIGHTSIGHTS V will be terminated and replaced by preparation of a report consolidating the findings of NIGHTSIGHTS IV in training development and evaluation work completed separately for night vision devices. Results of the studies will be integrated to develop implications for training in operation and maintenance of night vision devices.

5. Estimated Professional Man-Years Required:

FY 1973: Suspended

6. Interested Agencies:

Office of the Deputy Chief of Staff for Personnel, Department of the Army
Office of the Assistant Chief of Staff for Force Development, Department of the Army
U.S. Army Combat Developments Command, Experimentation Command
U.S. Army Armor School
U.S. Army Behavioral Science Research Laboratory
U.S. Army Mobility Equipment Research and Development Center
U.S. Army Human Engineering Laboratories
U.S. Army Medical Research Laboratory

7. Work Sub-Unit Summary and Forecast:

I. Effects of loss of dark adaptation on performance in representative field situations: Completed.

II. Determination of the relationship between conditions of dark adaptation and (a) duration, configuration, and intensity of stimulation, (b) performance requirements, and (c) modification of perception through training: Completed.

III. Survey of problems in the tactical employment of night viewing devices: Completed.

IV. Training program development for specific devices in SEA NITEOPS: Completed.

V. Approaches to the development of training for users of night viewing devices:

	FY 73			
	1	2	3	4
	*AD	DS	S	

VI. The effects of information load, location and mode of observation on detection and identification of brief targets:

	FY 73			
	1	2	3	4
	*S			

WORK UNIT STATEMENT

1. Research on Recruiting—RECRUIT (New)

2. Location: HumRRO Division No. 7 (Social Science)

3. Applied Program. Sponsors: U.S. Continental Army Command
U.S. Army Recruiting Command

4. Scope:

   a. Objective of Research. To provide research and development support for the Army's on-going recruiting effort, including the formal training of recruiting personnel. The initial objectives are to (1) identify critical recruiter skills and techniques, (2) develop methodology for evaluating recruiting appeals, (3) identify the classification of reasons given for enlisting in the Army, and (4) identify factors (positive and negative) that are involved in enlistment into the Army or in the selection of another service.

   b. Potential Military End-Result. Information will be acquired to serve as a basis for the evaluation of trainable recruiting skills and techniques. In addition, methodology will be developed to provide a means of estimating the effectiveness of recruiting appeals. The feasibility and practicality of creating a scientific recruitment pretest methodology for evaluating the probable effectiveness of selected recruiting appeals and techniques will be determined in order to enable the Army to accomplish more effectively the goals of the MVA and the zero draft program.

   c. Background. At present, little is known about the skills, characteristics, and techniques of successful recruiters. Information is needed as a basis for evaluation of recruiter training such as identification of trainable recruiting skills and techniques; in addition, methodology needs to be developed to provide a means of estimating the effectiveness of recruiting appeals.

      Sub-Unit I, which will consist of research on recruiter skills and techniques, is in response to a requirement of the U.S. Army Adjutant General School. Objective research will be undertaken to explore many critical questions concerning recruiting methods and behaviors and recruiter training.

      Sub-Unit II is in response to a requirement of Headquarters, U.S. Army Recruiting Command (USAREC). It will provide assistance in designing pretesting methods and procedures for the evaluation of recruiting appeals. Related studies, thus far, have been conducted only on the theme, "Today's Army Wants to Join You."

      Sub-Unit III has been established in response to another requirement of Headquarters, USAREC. Data already collected will be analyzed to identify the reasons that motivated persons to enlist in the Army, and to identify background factors that differentiate persons who enlisted in the Army from those who enlisted in other services or who did not enlist.

   d. Method of Attack:

      Sub-Unit I: Research on Recruiters. Work in FY 73 will involve studies of successful and unsuccessful recruiters. Emphasis will be placed on identifying, screening, and training variables that differentiate between the two groups.

During FY 74, development and experimental evaluation of revised recruiter screening and training programs will be undertaken.

Sub-Unit II: Methods of Pretesting Recruiting Advertising. Assistance will be provided to Headquarters, USAREC in the try-out of an approach for pretesting advertising appeals, and will include development of (1) one or more study designs for evaluating recruiting messages or appeals, and (2) methods for analyzing the results.

Sub-Unit III: Enlistment Motivation and Disposition of Army Applicants. More extensive and sophisticated analyses of survey information from recent Army enlistees will be made to better understand the motivation of potential Army enlistees. Implications of enlistment options, bonuses, advertising themes, and recruiter strategies will be analyzed and compared to those of other services.

5. Estimated Professional Man Years Required:

FY 73: 3.0
FY 74: 2.0

6. Interested Agencies:

Office of the Assistant Secretary of the Army (Manpower and Reserve Affairs)
Office of the Deputy Chief of Staff for Personnel, Department of the Army
Office of Personnel Operations, Department of the Army
U.S. Army Adjutant General School
U.S. Army Manpower Research and Development Center

7. Work Sub-Unit Summary and Forecast:

I. Research on recruiter skills and techniques:

FY 73				FY 74			
1	2	3	4	1	2	3	4
P	C	D	ADS	P	C	D	ADS

II. Methods of pretesting recruiting advertising:

FY 73			
1	2	3	4
P	C	D	ADS

III. Enlistment motivation and disposition of Army applicants:

FY 73			
1	2	3	4
	PA	AD	DS

EXPLORATORY RESEARCH

1. Human Factors Requirements in Airmobility During Continuous Operations—ER-92 (Continuing)

2. Location: HumRRO Division No. 6 (Aviation)

3. Applied Program. Sponsor: U.S. Army Combat Developments Command

4. Scope:

   a. Objective of Research. The objectives of this research are to (1) identify potential human factors problem areas in airmobility systems during continuous operations, and (2) define the aviation human factors system requirements in the identified problem areas with respect to personnel and materiel subsystems and doctrine.

   b. Military Problem. A requirement exists for Army aviation systems to be capable of continuous low-level operations for extended periods in sophisticated threat environments during conditions of darkness and limited visibility. Human factors considerations are recognized as a potential limitation in the establishment of the requirement.

      In order to define system requirements that will provide essential operational capabilities at minimum cost and complexity, it is necessary to consider human capabilities and limitations within the operational context. Without a definition of the human potential and limitations, the possibility exists that concepts, doctrine, and equipment could be developed that are not compatible with human performance capabilities. Further, the development of new complex subsystems in the cockpit without an integration concept for reducing the associated workload presents an unresolvable dilemma to the combat and materiel developers. Man-machine compatibility may well be the critical factor in determining mission success or in defining an affordable system. A source of human factors information that will promote significant improvements in man-machine compatibility for future aviation systems is needed by the combat and materiel developers.

   c. Approach. Relevant information from military and civilian sources is being gathered, analyzed, and synthesized in order to identify critical tasks of aircrews during continuous operations in future aerial mobility and firepower systems, and to determine the effects of extended periods of sleeplessness and stress on these tasks. During FY 72, work primarily consisted of information gathering and analysis, with tentative identification of a number of human factors problem areas. There was a review of the literature on sleep loss, stress, and fatigue, and an estimation of their effects on generic types of aircrew tasks. Night vision systems, warning systems, and cockpit integration concepts were emphasized in task and function analysis effort, and a preliminary set of recommended human factors requirements was developed for night vision systems. Human factors support was provided to other agencies concerned with requirements for low-level night operations.

      In FY 73, the information-gathering and analysis efforts will be completed and reported, with emphasis on identification of the human factors problem areas in low-level continuous operations through periods of darkness and limited visibility. Those aviation system human factors requirements that can be delineated without

further research will be defined. Other human factors problems requiring further research will be identified, along with an indication of the type of research required to resolve them.

5. Estimated Professional Man-Years Required:

FY 73: 1.8
FY 74: 0.5

6. Interested Agencies:

Office of the Assistant Chief of Staff for Force Development, Department of the Army
U.S. Continental Army Command
U.S. Army Materiel Command
U.S. Air Force Aerospace Medical Research Laboratory
U.S. Navy Aerospace Medical Institute
U.S. Marine Corps
Advanced Research Projects Agency, Department of Defense
Ministry of Defence, United Kingdom
Defence Research Board, Canada

2

Research Area 2:

UNIT TRAINING AND PERFORMANCE

Research Area 2:

Unit Training and Performance

Title:

Work Unit:

Improved on-the-Job Training for Logistics Personnel (JOBGOAL)

Description:

The main emphasis of the research activities in unit training and performance is in training groups of men to work together effectively in order to attain a designated objective. While training of group members in individual skills will be given attention as necessary, research efforts in this area will concentrate on selected Army activities that require coordinated group performance. In addition to work directly related to the team type of training, the research will explore ways in which group organization and interpersonal relations contribute to group effectiveness.

Level of Effort in FY 1973: .25 BMYs.

WORK UNIT STATEMENT

1. Improved On-the-Job Training for Logistics Personnel—JOBGOAL (Continuing)

2. Location: HumRRO Division No. 1 (System Operations)

3. Applied Program. Sponsor: Deputy Chief of Staff for Logistics, Department of the Army

4. Scope:

   a. Objective of Research. To determine and develop means for improving on-the-job training (OJT) for enlisted logistics personnel.

   b. Potential Military Research End-Result. (1) An assessment of the potential for OJT in CONUS organizations for jobs performed by senior logistics personnel in overseas locations. (2) An assessment of alternative means for conducting training on those tasks not suitable for OJT in CONUS.

   c. Background and Summary. Previous HumRRO research has been concentrated on means for improving school training. Research conducted under Exploratory Research 63, Logistics Systems, identified several specific OJT problem areas, including the loss of critical skills among logistics personnel during CONUS assignment, and the lack of capability of overseas commanders to fulfill their currently assigned OJT mission. Factors contributing to these problems include (1) conversion of many jobs from military to civilian, narrowing the working environment in which enlisted men may practice and improve their skills; (2) lack of experienced supervisors to conduct OJT in the field; (3) mal-assignment and training shortfalls, increasing OJT training requirements on field commanders.

   Under ER-63 and JOBGOAL I, studies were made to determine (1) the degree to which graduates of a formal Logistics OJT program were mal-assigned; (2) the relationship between such factors as career progression patterns, assignment policies, CONUS rotation base, and worldwide job distribution patterns, and their effect upon OJT policies; (3) a means for identifying the relationship between various resource factors and the ability of a unit to conduct OJT.

   In JOBGOAL II, visits were made to selected National Inventory Control Points (NICPs) to obtain information on the scope of work performed by senior enlisted logistics personnel (MOS 76P40). Data collected through interviews with personnel (MOS 76P40) returned from Inventory Control Center Vietnam (ICCV), and through study of various types of system documentation were used to develop data collection instruments. A content specialist from the U.S. Army Quartermaster School Enlisted Supply Department assisted in this effort. These instruments were used during an on-site visit to ICCV. The data collection on the jobs authorized to personnel with MOS 76P40 in ICCV was completed. Using these data, a questionnaire was developed to survey the NICP jobs, seeking to determine the extent to which tasks performed at ICCV are also performed at NICPs.

Analyses were made of the questionnaire survey results that indicated which ICCV jobs could be supported by OJT at NICPs. In addition, a specific set of assignment policies was developed that indicated how 76P40 personnel could be assigned to NICPs for OJT in ICCV job elements. Complementing the specific policies, a general method was developed for utilizing the data base to make decisions on assignments.

Reports describing the opportunity at NICPs for OJT in ICCV jobs, and on methods and procedures for identifying OJT content were drafted.

d. FY 73 Projection. Research staff interaction with interested agencies will be continued and the reports completed.

5. Estimated Professional Man-Years Required:

FY 73: 0.25

6. Interested Agencies:

Deputy Chief of Staff for Personnel, Department of the Army
Office of Personnel Operations, Department of the Army
U.S. Army, Pacific
U.S. Army, Europe
U.S. Continental Army Command
U.S. Army Materiel Command
U.S. Army Quartermaster School

7. Work Sub-Unit Summary and Forecast:

I. OJT resources analysis methods: Completed

II. Formal OJT:

	FY 73			
	1	2	3	4
	*S	S		

Research Area 3:

TRAINING FOR LEADERSHIP, COMMAND, AND CONTROL

3

Research Area 3:

Training for Leadership, Command, and Control

Title:

Work Units

Decision Making and Training Techniques for Command and Control Systems (DECIDE)
Factors in Military Organizational Effectiveness (FORGE)
Systems Engineering of Leadership Training for Officer Candidate Programs (OC LEADER)

Description:

Research activities in this area are directed toward increasing understanding of human factors aspects of leadership, command, and control, and studying approaches to officer training, including a systems engineering approach to leadership training. Research in this area is concentrated on the company and battalion levels in Infantry, and on the Combined Arms Tactical Training Simulator (CATTS) concept. The research efforts deal with command and control functions and problems, information requirements and other factors that enter into decision-making by the commander, determination of the content for particular courses, and studies of organizational effectiveness.

Level of Effort in FY 1973: 2.29 BMYs.

WORK UNIT STATEMENT

1. Decision Making and Training Techniques for Command and Control Systems—DECIDE (New)

2. Location: HumRRO Division No. 4

3. Technological Base Program

4. Scope:

   a. Objective of Research. To conduct an analysis of decision-making skills required in command and control situations at battalion level, and determine training procedures that can be used to increase such skills through the use of command and control simulators.

   b. Potential Military End-Result. The results of this research will provide basic information useful for wide application in command and control simulation efforts. Also, a decision-making model, command and control performance objectives, and performance standards will be developed that can be specifically applied to the Combat Arms Tactical Training Simulator (CATTS) being developed by the U.S. Army Infantry School.

   c. Background. The widespread use in Vietnam of the helicopter as a primary means of troop transportation and combat support created the initial interest in an effective and economically feasible means of training potential airmobile commanders in the basic techniques of airmobile command and control. It was quickly realized, however, that the development of successful simulation methods for *one* command and control environment would certainly have potential payoff for most or all *other* command and control environments. This realization led to the expansion of the initial concept (for an airmobile command and control simulator), so that current plans call for the development of a simulation means for developing and sharpening command and control skills in a variety of environments. It is intended that these plans will be implemented at the Infantry School in the form of a Combat Arms Tactical Training Simulator that will have the potential for exercising and training actual and potential battalion commanders and key staff members in the command and control aspects of tactical operations in a number of worldwide environments, under a variety of command and control environments.

   Exploratory Research 87 was initiated during FY 72 to determine the feasibility of contributing both to the development of the CATTS and to the development of improved software technology for training in the command and control function, in a variety of instructional settings other than CATTS. It appeared that this work should deal with the two aspects of the problem at two different levels, at least initially, and this approach was used in ER-87. At one level, it appeared necessary to develop a model of the decision-making process, that would provide insight concerning the command and control process in general. At the second level, for specific application to CATTS, it appeared essential to develop performance objectives in the command and control area that could be translated into training objectives for CATTS software development. In ER-87, work was directed toward both of these objectives. An extensive literature survey was conducted in the area of command decision-making, and on decision theory. The structure of a tentative decision-making model was defined, and work was initiated to incorporate research

findings relevant to the structure of the model. In addition, general approaches for the development of performance objectives were identified. (A substantial background in this area exists from previous HumRRO research, specifically Work Units CAMBCOM and FORGE.

d. Method of Approach. Work will continue on development of the decision-making model and the incorporation of findings from the research literature into its structure. This also will include a study of findings in the leadership and organizational effectiveness literature (e.g., FORGE), to ensure that the overall model includes variables of this type (e.g., one requirement for the potential commander is that he develop his staff to act as a team, complementing his own competencies). Work will be initiated to specify training objectives for CATTS through systems engineering procedures (CON REG 350-100-1), but with the recognition that the output of the systems engineering work will need to be supplemented with the findings developed during the decision modeling effort.

5. Estimated Professional Man-Years Required:

FY 73: 1.8
FY 74: 2.0

6. Interested Agencies:

U.S. Continental Army Command
U.S. Army Air Defense School
U.S. Army Infantry School
U.S. Army Armor School
U.S. Army Artillery and Missile School
Army Participation Group, Naval Training Device Center

7. Work Sub-Unit Forecast:

I. System analysis of command and control situation:

FY 73				FY 74			
1	2	3	4	1	2	3	4
P	PC	CA	CA	AD	DS	S	

II. Validation of decision making model and identification of training requirements:

FY 73				FY 74			
1	2	3	4	1	2	3	4
		P	PC	C	CA	CA	AD

WORK UNIT STATEMENT

1. Factors in Military Organizational Effectiveness - FORGE (Continuing)

2. Location: HumRRO Division No. 4

3. Technological Base Program

4. Scope:

   a. Objective of Research. To identify and discover ways of controlling human factors that influence the effectiveness of military organizations.

   b. Potential Military Research End-Result. Specific knowledge will be obtained on the human factors involved in command and control activities, and their contribution to organizational effectiveness. Such knowledge will enable commanders to better control their units and will permit improved training in command and and control activities. Additional benefits will be improved techniques for assessing organizational functioning and for evaluating performance of command and control activities.

   c. Background and Summary. Military organizations must be able to search out, accurately perceive, and correctly interpret the properties of operational situations; solve relevant problems; and react flexibly to changing situational demands. In addition to the need for technically competent personnel, effectiveness has been found to depend upon the efficient functioning of certain organizational processes for coordinating activities and integrating information and decisions. Whether these processes are effectively handled depends greatly upon certain social-psychological factors that operate to some degree in all organizations. These organizational processes, together with the social-psychological factors that impede or enhance performance of the processes, are being identified and studied in FORGE.

   The approach in FORGE I - to simulate an infantry battalion engaged in internal defense operations - was chosen to (1) identify and isolate organizational processes that are critical to the effective functioning of battalion command and control systems, (2) determine the specific contribution of these processes to mission accomplishment, and (3) determine how the processes are affected by the external pressures of combat. After data collection techniques and a standard simulation were developed, the data were collected on groups of officers as they performed in the situation.

   In FY 72, draft reports were submitted covering (1) the FORGE I simulation results and (2) the analysis of social-psychological factors that influence performance of critical organizational processes. Work was begun on the development of generally applicable concepts and procedures for control by leaders of factors that influence organizational effectiveness.

   d. FY 73 Projection. Work will be completed on development of the generally applicable concepts and control procedures, and a study will be made of the most effective techniques for training leaders to use the concepts and procedures.

5. Estimated Professional Man-Years Required:

   FY 73: 1.0

6. Interested Agencies:

U.S. Continental Army Command
U.S. Army War College
Industrial College of the Armed Forces
U.S. Army Command and General Staff College
U.S. Army Infantry School
U.S. Army Management School

7. Work Sub-Unit Summary and Forecast:

I. Identification of functions critical to organizational effectiveness: Completed.

II. Human factors affecting performance of critical functions:

FY 73

1	2	3	4
*AP	P	CA	DS

WORK UNIT STATEMENT

1. Systems Engineering of Leadership Training for Officer Candidate Programs—OC LEADER (Continuing)

2. Location: HumRRO Division No. 4

3. Applied Program. Sponsor: U.S. Continental Army Command

4. Scope:

   a. Objective of Research. To complete the first three steps of systems engineering of leadership training for the Infantry Officer Candidate School and to assist the U.S. Army Infantry School, as requested, in both the implementation of the work and the completion of systems engineering for this area.

   b. Potential Military Research End-Result. Validated training objectives that would have wide application in leadership training for noncommissioned officers as well as for officers should result from the systems engineering approach to training development.

   c. Background and Summary. Although the Officer Candidate Program develops excellent company officers, the leadership instruction had not been systems engineered to ensure that (1) the program's objectives were optimally oriented toward the actual duty performances required of the graduate, and (2) the methods for achieving the existing objectives were optimal. The U.S. Army Infantry School consequently requested systems engineering of the leadership instruction to accomplish these purposes. Previous work done by HumRRO—studies of leadership and studies of the OCS—was found to constitute a useful basis for this research. A job analysis, a training syllabus, and a training analysis have been completed. The results of the job identification substep and the inventory and selection of leadership tasks were reported. A report covering the last two steps of this systems engineering effort has been delayed to give priority to Technical Advisory Services.

   d. FY 73 Projection. The final report will be completed.

5. Estimated Professional Man-Years Required:

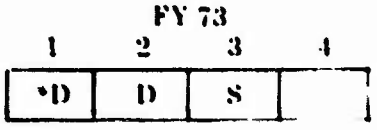
   FY 73: 0.1

6. Interested Agency:

   U.S. Army Infantry School

7. Work Sub-Unit Forecast:

   1. Systems engineering of leadership training for Officer Candidate programs:



Research Area 4:

AREA TRAINING

4

Research Area 4:

Area Training

Title:

Work Units

A Method for Training Military Personnel for Interaction With Foreign Nationals (COPE)
Research of a System for Debriefing Military Advisors (DEBRIEF)

Description:

The general objectives of efforts in this Research Area are to identify and improve training in cross-cultural skills that are important to stability operations in underdeveloped non-Western countries. Studies will be made to determine the cross-cultural skills, knowledges, and attitudes that are most likely to contribute significantly to success in stability operations. Training techniques to teach these cross-cultural attributes will be designed and tested.

Level of Effort in FY 1973: 1.00 BMY.

WORK UNIT STATEMENT

1. A Method for Training Military Personnel for Interaction With Foreign Nationals—COPE (Continuing)

2. Location: HumRRO Division No. 7 (Social Science)

3. Technological Base Program

4. Scope:

   a. Objective of Research. To design and evaluate an instructional method for improving the ability of military personnel to communicate with foreign nationals.

   b. Potential Military Research End-Result. The inclusion of this method in state-side area training programs or in orientation programs of overseas missions should increase the potential effectiveness of personnel who interact with foreign nationals.

   c. Background and Summary. Officers serving in U.S. Military missions overseas play a variety of roles (advisors, consultants, change agents, trainers, monitors) requiring effective communication with host-country personnel. In Latin America, Asia, and Africa, this is often difficult to achieve because many of the assumptions of Americans are not shared by host-country personnel. Cultural self-awareness (i.e., a person's awareness of how his thought processes and actions are influenced by his own cultural background) would remove one of the major obstacles to communication—the unwarranted, culturally determined assumptions Americans make (usually unwittingly) about the ways host-country nationals think.

      In the method being developed (known as the HumRRO Workshop in Intercultural Communication), trainees observe and react to video presentations of scenes showing how Americans think and act in simulated intercultural encounters. These presentations focus on certain characteristics (other than obvious customs and habits) that are shared by most middleclass Americans, but not by most people in Africa, Asia, and Latin America. The script for the scenes is based on video-taped role-playing encounters between various Americans—Army officers and personnel of other agencies represented overseas—and a foreign national.

      COPE I deals with the design of the method, COPE II with its evaluation. During FY 72, in Cope I, recordings of the required role-playing encounters were completed. The script for the production of the video recordings was completed and 90% was produced. Classroom tryouts of produced portions were conducted. An interim "package" was put together and introduced into the curriculum of the U.S. Army Command and General Staff College (USACGSC) and U.S. Army Institute for Military Assistance (USAIMA). In COPE II, a preliminary version of the test to be used in the evaluation was designed, and the test validation procedure was begun.

   d. FY 73 Projection. In COPE I, assembling and editing of the workshop "package" will be completed. In COPE II, test validation will be completed, and the evaluation of the instructional method will be implemented.

5. Estimated Professional Man-Years Required:

   FY 72: 0.5

6. Interested Agencies:

   Office of the Deputy Chief of Staff for Military Operations, Department of the Army
   Office of the Deputy Chief of Staff for Personnel, Department of the Army
   U.S. Continental Army Command
   Foreign Service Institute, U.S. Department of State
   Agency for International Development
   U.S. Information Agency
   ACTION

7. Work Sub-Unit Summary and Forecast:

   I. Design of the instructional method:

	FY 73			
	1	2	3	4
*DS				

   II. Evaluation of the instructional method:

	FY 73			
	1	2	3	4
*CA	DS			

WORK UNIT STATEMENT

1. Research of a System for Debriefing Military Advisors--DEBRIEF (Continuing)

2. Location: HumRRO Division No. 7 (Social Science)

3. Technological Base Program

4. Scope:

   a. Objective of the Research. To develop a scientifically constructed data bank that will preserve information about the diverse duties and experiences of military advisors in various alien cultures and environments.

   b. Potential Military Research End-Result. The data bank will provide a source of systematically collected and evaluated information about advisory work as conducted in both peaceful and hostile environments. The information obtained will be used to guide the development of better means for identifying, training, and utilizing advisory personnel. The research will develop and evaluate techniques, instruments, and systematic procedures for debriefing personnel from military assistance organizations (MAAG, Mission, and MilGp). The resulting data will be quantified and used for testing hypotheses that are basic to the development of advisory personnel and their operations.

   c. Background and Summary. It has proved to be very difficult to develop training curricula that are suitable for the various kinds of advisors, since their duties and problems vary with changes from culture to culture, and from one operational environment to another. It has also proved to be difficult to identify and utilize Army personnel who are temperamentally and motivationally suited (or unsuited) to represent the United States in unusual cultures with maximum effectiveness, and with complete acceptability to host country military personnel and populace. The difficulties appear to stem from a lack of systematically collected, organized, and evaluated reference information about military advisors, their duties, experiences, and personal characteristics.

   In FY 72, the Military Advisor Debriefing Questionnaire survey for military advisors in peaceful environments was completed, and a report was prepared providing information needed to improve training and utilization of advisory personnel in the foreign cultures concerned. A supplement to the above questionnaire covering Military Advising in Hostile Environments was constructed. The complete questionnaire was administered in CONUS to a large sample of men who had served previously as advisors in hostile environments.

   d. FY 73 Projection. The draft final report for advisors in peaceful environments will be revised. The data collected from advisors who served in hostile environments will be analyzed by computer, and the results will be reported. Consultations with experienced military advisors will provide further basis for the final report, discussing problems and recommendations for improving advisor identification, training, and utilization.

5. Estimated Professional Man-Years Required:

   FY 73: 0.5

6. Interested Agencies:

Office of the Deputy Chief of Staff for Military Operations, Department of the Army
Office of the Deputy Chief of Staff for Personnel, Department of the Army
Office of Personnel Operations, Department of the Army
U.S. Continental Army Command
U.S. Combat Developments Command
U.S. Military Assistance Commands (Worldwide)

7. Work Sub-Unit Summary and Forecast:

I. Debriefing studies within selected commands: Completed.

II. Feasibility of a system for debriefing military advisors:

	FY 73		
1	2	3	4
*AD	D	DS	

III. Research of a system for debriefing military advisors:

	FY 73		
1	2	3	4
*AD	D	DS	

Research Area 5:

TRAINING TECHNOLOGY

5

Research Area 5:

Training Technology

Title

Work Units

Systems Specifications for Army Computerized Training System (ACTS)
Computer Applications to Training for Advanced Learning in Integrated Systems Technology (CATALIST)
Improving the Classroom Effectiveness of Army Instructors (CLASSROOM)
Modernization of Synthetic Training in Army Aviation (SYNTRAIN)
Development of a Prototype Job-Functional Army Literacy Training Program (FLIT)

Exploratory Research

Cultural Self-Awareness Approach to Training in Interracial Communications (ER-94)

Basic Research

Improving Ability to See Military Targets (BR-16)
Design of a New Technique for Changing Racial Attitudes Among Military Personnel (BR-20)
Determining Ultimate Proficiency Levels Attainable by Low Ability Military Personnel (BR-21)

Description:

Many HumRRO research activities make contributions, direct or indirect, to the development of a technology of training, but in this Research Area the Work Units and other research efforts are specifically concerned with the subject of technology. Their objective is to develop general methods for training individuals and groups and for maintaining desired performance, methods that would be applicable for a wide range of subject matter and training circumstances. The research deals with both instructor-administered and instructor-free training, and there is special interest in techniques—such as simulation and automated instruction—that might lead to more efficient training, in terms of both time and money. Work on the development of specifications for a computerized training system for the Army is included. There is also interest in ways of improving training effectiveness through improved motivation, and in developing efficient training for soldiers of all aptitude levels. The research includes not only the development of techniques suitable for immediate implementation, but also more basic explorations into the learning processes that might lead to marked improvements in future training efforts.

Level of Effort in FY 1973: 26.65 BMYs.

WORK UNIT STATEMENT

1. Title: Systems Specifications for Army Computerized Training System—ACTS (New)

2. Location: HumRRO Division No. 1 (System Operations)

3. Applied Program. Sponsor: U.S. Continental Army Command

4. Scope:

   a. Objective of Research. To design and deliver hardware/software specifications for an integrated prototype multiprocessor mini-computer computer-administered instruction/computer-managed instruction (CAI-CMI) system to the U.S. Continental Army Command.

   b. Potential Military Research End-Result. Realization of the problems listed in paragraph c has resulted in a decision by the Army to develop a Computerized Training System (CTS) and have the system implemented and operational within 48 months. Design of the multiprocessor mini-computer prototype operational system will be completed before the end of FY 73.

   c. Background. Individualized instruction using the computer (i.e., CAI-CMI), is viewed as a promising approach to the solution of several major problems of Army trainers: (1) The demand for increasing skills; (2) limited financial resources; (3) a limited number of qualified instructor personnel; and (4) a volunteer student population of heterogeneous abilities.

   d. Method of Attack. Design requirements for a prototype multiprocessor mini-computer CAI-CMI system will be developed by initially providing preliminary hardware and software specifications, and recommended student wait time parameters and computer-managed instructional considerations for incorporation into the CTS. Subsequently, firm specifications in these areas will be completed and will be used as bases for the publication of requests for proposals by the Army. Simulations of design specifications will be provided.

5. Estimated Professional Man-Years Required:

   FY 73: 2.0
   FY 74: Dependent upon additional requirements desired by sponsor.

6. Interested Agencies:

   Office of the Assistant Vice Chief of Staff, Department of the Army
   U.S. Continental Army Command
   U.S. Army Signal Center and School, Fort Monmouth, New Jersey

7. Work Sub-Unit Forecast:

   Design and delivery of CAI-CMI system specifications for a Department of the Army computerized training system.

FY 73

1	2	3	4
PC	C	ADS	

WORK UNIT STATEMENT

1. Title: Computer Applications to Training for Advanced Learning in Integrated Systems Technology—CATALIST (New)

2. Location: HumRRO Division No. 1 (System Operations)

3. Technological Base Program

4. Scope:

   a. Objectives of Research. (1) To continue the development of practical methods and procedures for analyzing subject-matter information characteristics; defining overall subject-matter structure (organization); developing a micro-structure that would permit an adaptive instructional communication process to take place; and developing basic principles of on-line, real-time instructional decision making. Included are instructional design techniques such as authoring aids and test management capabilities. (2) To recommend necessary modifications for applying principles of instructional design and strategies and techniques to computer-managed instruction (CMI). (3) To complete the design and development of the prototype for a computer-administered instruction (CAI) dynamic visual display device. This device will allow generation of three-dimensional images in color and with gray level, and with rapid, real-time capability. Updating of the images for purposes of individualized sequencing will also be part of a video generator which will be designed and developed to drive the terminal. In addition, the capacity of the video generator will allow a cost/effective time-sharing facility for operational use of the terminal.

   b. Potential Military Research End-Result. Products from HumRRO Project IMPACT have already provided useful research information pertinent to the Army's needs. Continued research is required to provide the Army with a framework and capability for continued improvement and widespread implementation of individualized CAI-CMI training facilities and systems. Ultimately, the effort will give the Army its own capability for developing sound, effective CAI materials.

   c. Background. Individualized instruction using the computer (i.e., CAI-CMI) is viewed as a promising approach to the solution of several major problems of Army trainers: (1) the demand for increasing skills, (2) limited financial resources, (3) a limited number of qualified instructor personnel, and (4) a volunteer student population of heterogeneous abilities.

   d. Method of Attack. Work begun under Project IMPACT will continue on design and development of dynamic graphics display device, video generator development, and study of the concept of a Virtual Terminal Protocol (VTP). A VTP would permit a CAI system to operate with several different types of terminals. Instructional design aids and alternative instructional models will be developed and delivered as research products to operational users. Installation of two PLATO terminals in the 4th quarter of FY 73 will aid in these efforts. Research studies will be conducted to determine appropriate allocation of instructional processes to student or system control. These will be related to individualized student profiles.

5. Estimated Professional Man-Years Required:

   FY 73: 11
   FY 74: To be determined

6. Interested Agencies:

Office of the Assistant Vice Chief of Staff, Department of the Army
U.S. Continental Army Command
U.S. Army Signal Center and School, Fort Monmouth, New Jersey

7. Work Sub-Unit Forecast:

	FY 73				FY 74			
	1	2	3	4	1	2	3	4
Hardware (CHARGE Terminal & Video Generator . .		P	P	PD	D	S		
Software (Virtual Terminal Protocol)		C	P	PD	D	S		
Instructional Models & Authoring Aids	P	C	CA	CA	CA	CA	CA	DS

WORK UNIT STATEMENT

1. Improving the Classroom Effectiveness of Army Instructors—CLASSROOM (New)

2. Location: HumRRO Division No. 5

3. Technological Base Program

4. Scope:

   a. Objective of Research. To develop procedures and materials for training and evaluating Army instructors that will improve their classroom effectiveness.

   b. Potential Military Research End-Result. The procedures and instructional materials to be developed will enable Army schools to employ more valid and timely practices in training and evaluating instructors. These also will enable Army instructors to develop and implement more effective classroom management practices.

   c. Background. While some of the Army's training needs can be met in on-the-job settings, much training is highly technical and requires the facilities and capabilities of formal training institutions. This imposes a considerable burden on such institutions. Furthermore, because of current policies of short-term assignments for instructor personnel, supplying a sufficient number of instructors to meet all training needs requires the continuing operation of instructor training programs. At the same time, an examination of numerous instructor evaluation forms indicates that the emphasis in instructor training and evaluation in Army schools is directed more toward presentation skills of instructors than toward teaching skills. To help instructional departments produce more effective instructors, and to enable more meaningful evaluations of the performance of instructors, a comprehensive behavioral description of the characteristics of effective teaching is needed.

      A companion problem concerns the need for instructors to acquire classroom management techniques. While application of the techniques of contingency management in the classroom in recent years has shown promising results for adults and children, the acquisition of these capabilities by Army instructors has not been fostered. Contingency management, based upon principles of operant conditioning, refers to a set of procedures for the more effective direction and control of students. To increase the capabilities of Army instructors in this regard, the means by which contingency management techniques may be most effectively acquired need to be explored.

      In FY 72, HumRRO undertook Exploratory Research 91—Improving the Effectiveness of Army Instructors. This effort produced a model of the functions of a master instructor. A remaining problem is the development of specific procedures and materials that will enable Army schools to develop in instructors the designated classroom skills.

   d. Method of Attack. With the model of the functions of a master instructor as a guide, procedures and instructional materials to facilitate acquiring the desired instructor behaviors will be developed. This model is currently divided into four main functions and into some 40 subordinate functions or tasks. Each

subordinate function will become a "target" of the developmental effort, that is, a set of recommended training procedures will be generated for each subordinate function. Where appropriate, sample instructional materials will be developed. Recommended procedures and sample materials to facilitate evaluation of instructor performance will also be developed.

5. Estimated Professional Man-Years Required:

FY 73: .75
FY 74: 1.5

6. Interested Agencies:

U.S. Continental Army Command
All U.S. Army Schools

7. Work Sub-Unit Forecast:

FY 73				FY 74			
1	2	3	4	1	2	3	4
*P	CA	CA	CA	CA	CA	CA	CA

WORK UNIT STATEMENT

1. Development of a Prototype Job-Functional Army Literacy Training Program—FLIT (Continuing)

2. Location: HumRRO Division No. 3

3. Applied Program. Sponsor: U.S. Continental Army Command

4. Scope:

   a. Objective of Research. To develop an experimental Army literacy training program designed to provide a level of functional literacy appropriate to present minimal MOS reading requirements.

   b. Potential Military Research End-Result. This research is to develop a prototype literacy training program to produce ability to read and comprehend job-related reading materials with the skill and facility of a person having seventh grade general reading ability. The Army will obtain data indicating input qualifications, training duration and cost, staff qualifications, job-reading materials, and manuals for setting up and conducting the program. In an implementation-dissemination phase, a series of workshops and seminars will be conducted at Army Training Centers at which literacy training is to be provided.

   c. Background and Summary. Many men entering the Army are deficient in literacy skills and are being given remedial training in Army Preparatory Training (APT). The APT goal and graduation requirement of fifth grade reading level (5.0) appears to be inadequate in view of the following results from HumRRO Work Units REALISTIC and READNEED:
      (1) Men of poor reading and listening ability are heavily over-represented in the lowest quarter of job knowledge and hands-on job sample performance.
      (2) For MOSs into which a large number of lower aptitude men are assigned (Cook, Supply Clerk, General Vehicle Repairmen), a minimal reading level of 7.0 is necessary for satisfactory job performance.
      (3) In a sample of seven MOSs, literacy requirements of job reading material ranged far higher than 7.0 when assessed by measures calibrated on the Army population.
      (4) Results in job reading task, job knowledge, job sample, and Army MOS proficiency tests indicate that different MOSs have different reading demands; therefore, literacy training should be geared to a man's MOS.

      The implications is that the aim of the APT program should be to produce job-related reading skills for men reading below the seventh grade level. Work toward this objective in Work Unit FLIT has included varied activities:
      (1) The APT school at Fort Ord was designated as an experimental school, with CONARC approval for the Chief of the U.S. Army Training Center Human Research Unit at Presidio of Monterey to waiver all CONARC directives for APT, including length of course, graduation requirements, selection procedures, curriculum, and materials.
      (2) Baseline data were obtained on performance at the Fort Ord APT prior to any experimental changes.
      (3) Baseline data were obtained on performance at the Fort Ord APT following the directive to change the graduation objective to 7.0 and keep everyone in the course six weeks. This was done to determine how well the

existing Fort Ord program could accomplish the objective of improving reading ability in a 6-week period.

(4) Materials were ordered and reviewed for possible inclusion in the experimental program.

(5) Four APTs, a job corps center, and the Air Force literacy program were visiting various program centers to study procedures that might be useful in a new Army-wide program.

(6) Experimental modules in individualized reading and in group oral reading were developed and tried out.

(7) To aid CONARC review of the need for continuing APT after the end of Project 100,000 and the raising of Army entry requirements, the FLIT staff analyzed data from six APT programs during February-March 1972. Some 11% of Mental Category IV men qualified for APT under the 5.0 reading grade level entrance requirements. These data, collected under the higher selection standards after the end of Project 100,000, indicate that if the Army input in a year were 100,000 men, 20,000 would be Category IV men of whom 2,000 would qualify for APT under present standards (i.e., less than fifth grade reading level). Under FLIT standards (i.e., less than sixth grade reading level), about 25% of Category IV men and 10% of Category III men need literacy training.

(8) Seven MOS courses at Fort Ord were surveyed to assess reading requirements, frequency of use of course reading materials, and relative importance of reading materials on the job. Job-related and job-technical reading material proved to be used frequently both in MOS courses and on the job.

(9) Because of the importance of providing reading instruction that is MOS-related, coordination with CONARC and Fort Ord was accomplished to schedule APT at the end of BCT, after a man's MOS has been determined.

d. Method of Attack. A model program has been designed having specifications that include:

(1) An objective of teaching men to read job-related reading materials with the facility of a person having seventh grade general reading skills.

(2) The use of specially prepared job-reading materials.

(3) The use of individualized instructional modules.

(4) Student-assisted instruction.

(5) Quality control.

(6) Job-specific and general language development.

(7) Implementation and dissemination materials and workshops.

Program development will follow a series of cycles through FY 73, with implementation and dissemination in FY 74. Arrangements have been made to implement a post-BCT APT program under full operational staffing and management of a FLIT staff.

5. Estimated Professional Man-Years Required:

FY 73: 1.9
FY 74: 3.0

6. Interested Agencies:

Office of the Assistant Secretary of Defense (Manpower and Reserve Affairs)
Office of the Deputy Chief of Staff for Personnel, Department of the Army

U.S. Department of Health, Education, and Welfare
U.S. Department of Labor

7. Work Sub-Unit Forecast:

FY 73				FY 74			
1	2	3	4	1	2	3	4
*PCA	PCA	PCA	PADS	PCS	PCA	PCA	PCADS

WORK UNIT STATEMENT

1. Modernization of Synthetic Training in Army Aviation—SYNTRAIN (Continuing)

2. Location: HumRRO Division No. 6 (Aviation)

3. Technological Base Program

4. Scope:

   a. Objective of Research. To expedite the application of advances in training technology to the design and utilization of Army synthetic training equipment, through surveys of training device design requirements and technology and the conduct of human factors and training research.

   b. Potential Military Research End-Result. This Work Unit will facilitate the acquisition and use of modern synthetic aviation training equipment, thereby increasing the economy and efficiency of flight training programs and increasing the responsiveness of the aviation training base.

   c. Background and Summary. The purpose of this Work Unit is to reduce the lag that exists between development and application in the design and use of synthetic flight training equipment. The SYNTRAIN approach follows six developmental steps: (1) familiarization with the training requirements to identify areas where use of synthetic trainers is indicated; (2) familiarization with training, training management, and engineering technologies relevant to synthetic trainer design to identify applicable concepts and techniques; (3) specification of the characteristics of required synthetic training devices and programs; (4) technical assistance to the using, reviewing, and developing Commands, to assure that the advanced training concepts of the proposed synthetic trainers are preserved during the development cycles; (5) identification of gaps in the human factors and training data, and the conduct of research studies to develop necessary data; (6) evaluation of prototype training devices to ensure their suitability to the training requirement.

   Five Work Sub-Units have been planned, each dealing with a major area of Army aviation training: rotary wing, fixed wing, tactics, maintenance, and air traffic control. The six developmental steps are being followed in each Sub-Unit except where prior research has provided the required information.

   SYNTRAIN I, Synthetic Rotary Wing Training: Service testing of a developmental model of a Synthetic Flight Training System (SFTS), the design of which is based largely upon HumRRO research information, has been completed at the U.S. Army Aviation School. HumRRO's participation in the service test included determining the device's suitability for training use by the Army (Step 6). As a result of use of the new device with a training program designed specifically for it, the number of aircraft flight hours required to complete initial entry rotary-wing instrument training was reduced from 60 to 6. A need for a larger repertoire of automatic training exercises for use in the device, and for further analysis of data generated by the quality control subsystem of the device was identified during the service test. Human factors considerations concerning design-for-training features of an SFTS subsystem for CH-47 training were provided to the Aviation School and the Naval Devices Training Center.

SYNTRAIN II, Synthetic Fixed Wing Training: The developmental steps resulted in identification of a commercially available device that could contribute to modernizing Army fixed wing synthetic instrument training; the device was procured by the Aviation School and tested. Training programs were designed specifically for use with the device. A method-of-instruction course for Aviation School instructor pilots also was developed, and School personnel were trained to administer the new training programs. Use of the new device with the training programs designed for it resulted in a 40% reduction in flight hour requirements for fixed wing twin-engine qualification and instrument training. Planned activity for this Sub-Unit has been completed.

SYNTRAIN III, Synthetic Tactics Training: Assistance to the Aviation School in the development of functional characteristics for tactics synthetic training equipment (Steps 1, 2, and 3) was suspended with interruptions of AH-56 procurement activities. Future Sub-Unit activities will be subject to the requirements of armed helicopter procurement.

SYNTRAIN IV, Synthetic Maintenance Training: Initial activity (Step 1) was interrupted because personnel were not available. Resumption is planned as Sub-Unit I activities are concluded.

SYNTRAIN V, Synthetic Air Traffic Control Training: Activity has not been initiated because of lack of personnel.

d. FY 73 Projection. Under SYNTRAIN I, additional development of training techniques appropriate to SFTS advanced design features will be undertaken jointly with the Aviation School. In SYNTRAIN III, the requirements for tactics training devices will be reviewed with Aviation School personnel. Planning for SYNTRAIN IV will be completed and work will proceed in accordance with the outlined steps. Planning in SYNTRAIN V will be initiated if personnel are available.

5. Estimated Professional Man-Years Required:

FY 73: 3.80
FY 74: 4.0

6. Interested Agencies:

U.S. Continental Army Command
U.S. Army Aviation School
U.S. Army Human Engineering Laboratories
U.S. Army Avionics Laboratory
U.S. Army Aeromedical Research Laboratory
U.S. Naval Training Device Center
U.S. Air Force Aerospace Medical Research Laboratory
U.S. Air Force Human Resources Laboratory
U.S. Coast Guard
Federal Aviation Administration
National Aeronautics and Space Administration
Various nongovernment research agencies and industries where research and development related to synthetic trainer design and utilization are under way.

7. Work Sub-Unit Summary and Forecast:

I. Synthetic rotary wing training:

FY 73				FY 74			
1	2	3	4	1	2	3	4
*C	C	CA	CA	AD	AD	S	

II. Synthetic fixed wing training: Completed

III. Synthetic tactics training: To be determined

IV. Synthetic maintenance training: To be determined

V. Synthetic air traffic control training: To be determined

EXPLORATORY RESEARCH

1. Cultural Self-Awareness Approach to Training in Interracial Communications—ER-94 (New)

2. Location: HumRRO Division No. 7 (Social Science)

3. Technological Base Program.

4. Scope:

   a. Objective of Research. To evaluate the feasibility of applying a cultural self-awareness approach to the development of training in interracial communication.

   b. Military Problem. Interracial antagonism and friction have various causes. Efforts are under way in the Army to deal with some of these causes. Much of the problem, however, can be attributed to lack of communication in interpersonal encounters between Whites and Blacks. This phenomenon is difficult to deal with, because it is often totally unrecognized by the participants in such encounters. Present efforts toward lessening friction are concerned primarily with the correction of valid grievances, and the avoidance and proper handling of critical incidents by commanders. Little is being done to improve skills in interracial communication, primarily because no successful and widely applicable technique for developing such skills exists.

   c. Approach. The HumRRO Workshop in Intercultural Communication (developed in Work Unit COPE) employs an approach that focuses on problems in interpersonal communication (in intercultural encounters) caused by lack of cultural self-awareness, that is, people's inability to recognize how their own thinking and behavior is influenced by cultural factors. This shortcoming leads people to make unwarranted false assumptions (usually unwittingly) about the thinking of other people in an encounter. There seems to be a sufficient degree of cultural difference between a majority of Whites and a majority of Blacks to suggest that the same problem exists in many of their encounters with each other.

      The proposed research will seek to determine the extent to which this assumption is correct; its degree of validity will suggest how fruitful a cultural self-awareness approach would be. Information needed for this purpose will be obtained through interviews with Black and White military personnel and a literature survey. If cultural differences can be identified that affect communication in significant ways, a sample of the training technique will be developed to assess its applicability.

5. Estimated Professional Man-Years Required:

   FY 73: 1.0
   FY 74: 2.0

6. Interested Agencies:

   U.S. Army Motivation and Training Laboratory

BASIC RESEARCH

1. Improving Ability to See Military Targets—BR-16 (Continuing)

2. Location: HumRRO Division No. 5

3. Technological Base Program

4. Estimated Professional Man-Years Required

   FY 73: 1.0
   FY 74: 1.0

5. Many military tasks involve visual detection, identification, or discrimination between objects, shapes, or patterns. Among these tasks is the detection and recognition of aerial and ground targets. This research effort will provide an assessment of fundamental factors which influence visual perception and an evaluation of methods used in training visual perception. An objective of this effort will be to develop a model of detection and recognition performance where both human and physical parameters are taken into account. Also, it is intended to determine which of the human factors involved may be influenced by training.

   Previous research conducted under this effort includes the following:
   (1) Studies of the influence of shape and orientation on object recognition including the effects of various backgrounds.
   (2) Development of a computer model of human pattern recognition and classification employing stylized aircraft silhouettes.
   (3) A study of the effects of knowledge of results on pattern recognition.
   (4) The relationship between contour deformation and judgments of shape, size, and distance.
   (5) The ability of observers to detect cue similarities and differences among a set of shapes having common or redundant characteristics.
   (6) Preliminary development of a mathematical model of aircraft detection and recognition.
   (7) Studies of the perception of radial motion.
   (8) Investigation into the relationship between several measures of time perception and range estimation.

   During FY 73, work will be conducted in the following areas:
   (1) Continued development of a model of aircraft detection and recognition.
   (2) Additional studies of the perception of radial motion.
   (3) The effectiveness of selected training methods in teaching pattern recognition and classification.
   (4) Investigation of transformation invariate cues in aircraft recognition.

6. Interested Agencies:

   U.S. Continental Army Command
   U.S. Army Combat Developments Command
   U.S. Army Air Defense School

BASIC RESEARCH

1. Design of a New Technique for Changing Racial Attitudes Among Military Personnel—BR-20 (Continuing)

2. Location: HumRRO Division No. 7 (Social Science)

3. Technological Base Program

4. Estimated Professional Man-Years Required:

   FY 73: 1.5
   FY 74: 0.5

5. The objective of this research is to design and evaluate a technique—based upon a concept of "vicarious attitude change"—that would increase the effectiveness of audiovisual materials directed against racial prejudice.

   Instruction in race relations typically includes films (or videotape recordings) intended to change the racial attitudes of the viewers. Although the state of the art in the production of such "message" films seems to be improving, a review of a selected sample suggests that producers are still not primarily concerned with the effectiveness of their films. The proposed research will develop and evaluate an experimental version of a technique that would make such films more effective through the application of a concept of "vicarious attitude change" in their production.

   This concept refers to an assumed process by which a person, as a result of his vicarious experience of an attitude change in another person, undergoes a similar change himself. The technique would create this process among target audiences by showing them specially produced films (or video recordings) of the occurrence of the desired change in a person with whom they can identify.

   During FY 72, various techniques for producing the required audiovisual material were explored and a pilot study was conducted.

   During FY 73 an experimental version of the chosen technique will be designed and evaluated.

6. Interested Agencies:

   Office of the Deputy Chief of Staff for Personnel, Department of the Army
   U.S. Continental Army Command
   U.S. Navy
   U.S. Air Force

BASIC RESEARCH

1. Determining Ultimate Proficiency Levels Attainable by Low-Ability Military Personnel--BR-21 (Continuing)

2. Location: HumRRO Division No. 3

3. Technological Base Program

4. Estimated Professional Man-Years Required:

   FY 73: 3.7
   FY 74: 3.0

5. The objective of this research is to determine the range and scope of the learning capacity of marginal Army personnel, to observe the longitudinal effects of long-term, self-managed learning strategies, and to determine the proficiency levels that these men can reach as a result of these strategies.

   In Work Unit SPECTRUM, overall instructional strategies that work best with low-ability individuals over the short term have been determined. Under Work Units EVATP and APSTRAT, considerable evidence has been obtained to show the efficacy of such approaches in operational contexts. This effort will attempt to ascertain what factors in the learning environment enhance or limit attainment of growth by low-ability personnel in education and training.

   The basic approach is to develop a highly individualized instructional program based upon each man's entry-level capabilities and interests. Men will initially be encouraged to set short-term goals for themselves, and the staff will assist each man to identify and attain his goals, thereby beginning a pattern of successful learning experiences. With continued success in the fulfillment of short-term goals, the men will gradually learn to set and fulfill longer term goals as the project continues. This acquisition of self-management will be carefully observed and measured for each individual. Emphasis will be on both educational and training methodology and measurement of "hard" and "soft" skills and knowledges for highly individualized situations.

   Selection criteria and procedures have been developed and a group of 12 "lower ability" volunteers (i.e., Mental Category IVs in the Armed Forces Qualification Test) have been accepted into the program; subsequently, an additional 12 will be selected. Volunteers are placed under direct control of the Chief of the U.S. Army Human Research Unit at the Presidio of Monterey with their duty assignment to participate on this research effort; the assignment period will extend up to two years. Arrangements have been made so that men can, if they wish, receive both training for MOS qualification and specific educational development.

   The outcome of this effort will be a better understanding of the way and the extent to which low-aptitude personnel can self-manage their training and educational growth. The applied value lies in the area of manpower development, leading toward more effective utilization of marginal personnel in both military and civilian settings.

6. Interested Agencies:

   Office of the Assistant Secretary of Defense (Manpower and Reserve Affairs)
   Office of the Deputy Chief of Staff for Personnel, Department of the Army
   U.S. Continental Army Command

U.S. Armed Forces Institute
U.S. Army Schools and Training Centers
U.S. Department of Health, Education, and Welfare
U.S. Department of Labor
Office of Economic Opportunity

Research Area 6:

TRAINING MANAGEMENT

Research Area 6:

Training Management

Title:

Work Units

Review, Evaluation, and Refinement of Performance Training in Army Training Centers (ATC-Perform)
Dimensions of Attitude and Behavioral Change Programs (COMMUNICATE)
Development of Methods for Improving Soldier Adjustment to the Army (ESPRIT)
Training Research in Support of Military Assistance Command Training Directorate (MACT)
Research Into Methods of Data Acquisition in Selected Social Problem Areas in the Military (MODE)
Model for Systems Engineering of Man-Ascendant Jobs (MODMAN)
Prediction of Training and Operational Performance of Army Aviators (PREDICT)
Procedures for Individualized-Instruction System Management (PRISM)
Developing Criteria for the Selection of Methods and Media by Army Trainers (SMMART)
Support of the Army's Field Experimentation in Service Attractiveness and Training Programs (VOLAR EVALUATION)

Exploratory Research

Strategic Communications Personnel and Training Requirements (ER-93)

Description:

Research in this area goes beyond improvements in training content and instructional methods. Efforts include analysis of the Army training organization and its place in the Army structure, as well as activities relating to administrative and organizational problems within the training system. The Research Area includes activities directed toward necessary modification of training administrative procedures and organizational structure to allow effective introduction of improved instructional procedures.

Level of Effort in FY 1973: 24.3 BMYs.

WORK UNIT STATEMENT

1. Review, Evaluation, and Refinement of Performance Training in Army Training Centers (ATC-Perform) (New)

2. Location: HumRRO Divisions No. 3, No. 2, and No. 5

3. Applied Program. Sponsor: U.S. Continental Army Command

4. Scope:

   a. Objective of Research. To assist the Army in the review, evaluation, and refinement of performance-based training in BCT and AIT programs.

   b. Potential Military Research End-Result. This effort will result in major revision of Army training in Basic Combat Training (BCT), and in Advanced Individual Training (AIT) both in Combat Arms Training and in Combat Support Training. Impact of this work will be reflected in the training conducted in all Army Training Centers (ATC). The end result will be the establishment of a philosophy of training that incorporates the latest innovations in instructional technology based upon the following six main principles: performance-based instruction, absolute criterion (go/no-go), functional context, individualization, feedback to trainees and instructors, and quality contro'.

   c. Background. The principles upon which the course revisions have been and will continue to be based derive from a variety of sources: psychological research on learning, basic concepts of instructional technology, and applied research on military training problems by HumRRO. The HumRRO research in the Experimental Volunteer Army Training Programs (EVATP) and on individualization of instruction in training centers (Work Units SPECTRUM and APSTRAT) constitutes the main data base for these revisions. As a result of the development and field test of EVATP and APSTRAT, the Army directed that these approaches be incorporated into revised BCT and AIT programs.

      During FY 72, HumRRO has worked with the Army to further the above objectives. For BCT, activities included further development and refinement of the instructional system, plus a major involvement in transmitting the concepts and assisting in establishing the system at Forts Jackson, Polk, Dix, Leonard Wood, and Knox. In addition, staff visits were made to 15 installations that were either administering AIT and AIT Combat Support Training or were the proponent schools for such programs. The purpose of these visits was to interact with personnel at all echelons in order to transmit the concepts and discuss the viability and applicability of these instructional strategies for their programs. Briefings and discussions of these concepts occurred with the Marine Corps, Air Force, and Department of Defense staff agencies. HumRRO personnel participated in work shops, with Fort Ord personnel and representatives of various proponent schools for AIT Combat Support Training Programs.

   d. Method of Attack. HumRRO will provide the technical competence necessary for the review, evaluation, and refinement of Army training programs that were revised during the FY 72 effort. This effort will be undertaken with the proponent school and selected training center. HumRRO's principal area of concern will pertain to evaluation and reevaluation of training methods and techniques being employed, and their refinement if necessary.

For BCT, the emphasis will be on refinement of the program and development of materials to enhance implementation. Activity will focus on incorporation of this instructional strategy into appropriate Instructor courses, Drill Sergeant courses, and Leadership programs. Further, BCT will be examined to determine where and how educational television (ETV) could be used within this instructional method. HumRRO will also develop and test an effective Learning Center concept for accomplishing makeup, review, remediation, practice, and enrichment in BCT. Consulting activities and visits will continue with all BCT training centers.

For AIT, HumRRO will provide the technical competence necessary for the continuation of refinements of Army training programs for AIT, Infantry, Artillery, and Armor. This effort will include in-depth guidance on generalizing research findings and appropriate analysis for applying, and participating in the planning and conduct of tests and evaluations of resulting revisions including the determination of necessary and recommended refinements, with emphasis on methods of instruction. Further, AIT will be examined to determine where and how ETV could be used within this instructional method.

For AIT Combat Support Training, HumRRO will provide the needed technical competence for refinement of Army training programs for Wheeled Vehicle Repairman, Supply Clerk, Cooks, Radio Operator, Clerical, and Vehicle Driver courses. This effort will include a coordinated HumRRO/ATC/proponent school design, test, and evaluation of revised programs and subsequent refinements. HumRRO will be primarily concerned with determination of methods of instruction to be used, provision of necessary implementing guidance for instructors, evaluation of methods of instruction used, and determination of needed and desired changes in methods of instruction. Further, AIT Combat Support Training will be examined to determine where and how ETV could be used in this training.

HumRRO will develop the technical input for new methodology necessary for changes within the instructional training blocks for ATC Drill Sergeant Schools, NCO Academies, and Special Leadership Preparation Programs.

HumRRO will prepare guidance for implementation of the performance-based training philosophy by National Guard and Reserve Units.

HumRRO will develop a manual generalizing the philosophy of training to incorporate the principles of performance-oriented training, absolute criterion testing (go/no-go), functional context, individualization, feedback to trainees and instructors, and quality control, readily usable at unit level.

5. Estimated Professional Man-Years Required:

FY 73: 8.8
FY 74: 6.0

6. Interested Agencies:

Office of the Assistant Secretary of Defense (Manpower and Reserve Affairs), Department of Defense
Deputy Chief of Staff, Individual Training, CONARC
U.S. Army Training Centers
Proponent Schools for BCT, AIT, and selected AIT programs
Office of the Chief of Staff for Reserve Components
National Guard Bureau
Department of Health, Education, and Welfare
Department of Labor

7. Work Sub-Unit Forecast:

FY 73				FY 74			
1	2	3	4	1	2	3	4
PCA	PCA	PCA	PCA	PCA	PCA	PCA	PCA

WORK UNIT STATEMENT

1. Dimensions of Attitude and Behavioral Change Programs—COMMUNICATE (New)

2. Location: HumRRO Division No. 2

3. Technological Base Program

4. Scope:

   a. Objective of Research. To determine the effects of program duration, degree of individual participation, and audience size on the effectiveness of military educational programs designed to achieve attitude and behavioral change.

   b. Potential Military Research End-Result. The findings will help assure success in developing future educational programs designed to effect attitude and behavior change, and should lead to the improvement of current educational program approaches within the Army. The results will also be applicable to the development of civilian educational programs with a purpose of effecting attitude and behavior change. Family planning, ecology, race relations, and drug abuse are examples of areas in which the application of the findings from this study could prove beneficial.

   c. Background. Military, as well as civilian, communities are constantly faced with social problems, such as drug abuse, alcohol abuse, racial discord, morale and discipline, and family planning. In addition, the military faces more specific problems, such as recruitment, reenlistment, and the assignment of personnel to a wide variety of geographical locations. Inherent in the treatment of both types of problems is a desire for effective communication and, at times, a need to effect attitudinal and behavioral change. Because it must deal with large numbers of people, the military needs an efficient and effective means for handling the problems when and where they arise.

      When attitude and behavior change efforts are required, it is important that these be designed so implementing them will be practical and likely to succeed. Research efforts to improve the effectiveness of such programs can yield major benefits in terms of the time and manpower saved in administering a program. If research indicates that an attitude or behavior change program can be as effectively administered to a group of 50 individuals as to a group of 10, then much time and effort can be saved by working with the larger groups. If a program can be effectively administered in one hour instead of five hours, the savings can be substantial. If participation by the individual is not necessary to the program's effectiveness, time and effort can be saved when active participation by the subjects in the program is not included.

      Study of these factors is of critical importance from a practical standpoint since programs requiring less manpower and time to administer may yield results as effective as more time-consuming programs, requiring more personnel. If time-consuming programs that are of long duration, are administered to small groups of people at one time, or involve the active participation of subjects in the program prove to be less effective than time-saving programs, they should be replaced.

   d. Method of Attack. The effects of three different program dimensions—selected because of their relevance to military situations—on the effectiveness of

educational programs will be studied. The dimensions are the duration of the program, the degree to which audience members have the opportunity to actively participate, and the size of the audience. Education programs differing in these dimensions will be administered to military personnel in different basic training companies, and their effects upon attitudes, knowledge, and related behavior will be ascertained.

The programs will be either long or short; will involve active audience participation or will not; and will be administered to a small group of participants (15 or fewer) or to a large group (50 or more). The effects of each dimension will be examined with reference to attitudes toward the issue of the program, knowledge of information communicated in the program, and related behaviors. These criterion measures will be administered before the education programs to determine the initial similarity of the groups, and again following the programs to determine program effectiveness.

5. Estimated Professional Man-Years Required:

FY 73: 1.5
FY 74: 0.5

6. Interested Agencies:

Office of the Deputy Chief of Staff for Personnel, Department of the Army
The Surgeon General, Department of the Army
The Provost Marshall General, Department of the Army
U.S. Continental Army Command
U.S. Army Training Centers

7. Work Sub-Unit Forecast:

FY 73				FY 74			
1	2	3	4	1	2	3	4
P	P	PC	C	A	AD	D	S

WORK UNIT STATEMENT

1. Development of Methods for Improving Soldier Adjustment to the Army—ESPRIT (Continuing)

2. Location: HumRRO Division No. 2

3. Applied Program. Sponsor: Deputy Chief of Staff for Personnel, Department of the Army

4. Scope:

   a. Objectives of Research. To develop measuring instruments for determining motivation and attitude deterioration among enlisted men, and to adapt and evaluate methods for increasing motivation and preventing attitude deterioration.

   b. Potential Military Research End-Result. Results of this research should provide information and techniques that will enable the Army to improve the attitudes of enlisted men toward the Army, increase the work motivation of enlisted men, increase the reenlistment rate, increase efficiency by reducing the number of delinquent acts, improve the civilian image of the Army, and assist in future VOLAR planning.

   c. Background and Summary. To improve the performance effectiveness of the enlisted man and to increase his career potential, it will be necessary to improve attitudes toward the Army and increase motivation to perform efficiently. Previous research has shown that basic training typically results in attitude deterioration, and that the resulting negative attitudes often persist throughout a soldier's career, leading to reduced work efficiency and ultimately to lower reenlistment rates. If sources of attitude deterioration are located, social psychological principles capable of improving attitudes and increasing motivation can be applied.

      Exploratory Research 74, Soldier Esprit, indicated that attitude questionnaires and need satisfaction tests can identify the aspects of military life that lead to dissatisfaction and low career potential, personality tests are potentially useful in predicting reenlistment intentions of NCOs and delinquency among enlisted men, and conflicts between the needs and goals of the individual soldier and those of the Army can be identified. These techniques were applied in ESPRIT I to locate sources of attitude deterioration among basic trainees and to determine how accurately the cadre perceived the attitudes and needs of the trainee.

      In ESPRIT II, a questionnaire was developed that could be used to detect future attitude change among soldiers. In ESPRIT III, delinquency scales, personality scales, attitude questionnaires, and background information forms were administered to basic trainees to determine the personal factors affecting delinquency and to assess their adequacy in predicting delinquency. In ESPRIT IV, a literature review identified techniques that have been used to change attitudes. Each technique was considered in terms of its potential use to the Army as a means of improving attitudes of enlisted men.

   d. FY 73 Projection. Preparation of the reports prepared for ESPRIT I, II, III, and IV will be completed.

5. Estimated Professional Man-Years Required:

   FY 73: 0.5

6. Interested Agencies:

   Office of Personnel Operations, Department of the Army
   U.S. Continental Army Command
   U.S. Army Combat Developments Command
   U.S. Army Behavior and Systems Research Laboratory

7. Work Sub-Unit Summary and Forecast:

   I. Identification of sources of attitude deterioration among basic trainees:

FY 73			
1	2	3	4
*D	S		

   II. Development of a measure for detecting future attitude change:

FY 73			
1	2	3	4
*D	DS		

   III. Identification of potential delinquents among basic trainees:

FY 73			
1	2	3	4
*D	D	S	

   IV. Survey of techniques to prevent attitude deterioration and increase motivation:

FY 73			
1	2	3	4
*D	D	S	

WORK UNIT STATEMENT

1. Training Research in Support of Military Assistance Command Training Directorate—MACT (Continuing)

2. Location: HumRRO Operations Directorate; Advisor in Republic of Vietnam

3. Applied Program. Sponsor: U.S. Army Research Office, Office of the Chief of Research and Development, Department of the Army

4. Scope:

   a. Objective of Research. To provide advisory services on training research and development to the Military Assistance Command Training Directorate (MACV).

   b. Potential Military Research End-Result. Research and development requirements to be formulated by the HumRRO advisor in conjunction with MACT and Vietnamese military personnel will permit early implementation of research and development projects. The results of these efforts are expected to enhance significantly the Vietnamization program of MACV. The work may also identify and cause to be initiated additional research and development projects to be undertaken by CONUS military or civilian research agencies.

   c. Background and Summary. The ultimate goal of the U.S. advisory efforts in Vietnam training is to enable the Republic of Vietnam Armed Forces (RVNAF) to train its own forces to a level of competence consistent with its national defense responsibilities. The more rapidly this can be achieved, the better the interests of both the United States and the Republic of Vietnam will be served. As a result of a visit to RVN by a HumRRO team in June 1970, a comprehensive assessment of RVNAF training needs was accomplished. The team recommended that research personnel qualified in training management and educational or industrial psychology be engaged to instruct advisors and RVN counterparts in the principles of training management and program development, assist in the development of RVN training programs, and provide specific advice and assistance to individual RVN schools and training centers.

   Assistance of an advisor was provided during FY 72 to the Director of MACT in the design and conduct of studies of RVNAF training and operations, including:
   (1) Studies on the present training, including recommended changes.
   (2) Studies in the design and analysis of training.
   (3) Personnel and operational studies.
   (4) Other studies as requested by MACT.

   An office of Training Research and Development was established within the Central Training Command (CTC) of the RVNAF. Qualified RVNAF personnel were assigned to this office and a joint MACT/OTRD, CTC effort was initiated to establish a training R&D capability within the RVNAF.

   Particular emphasis was placed on training systems engineering, training management, and evaluation. Appropriate U.S. instructional systems development documents were translated into the Vietnamese language and made available to RVNAF training personnel. Initial activities to systems engineer specific training

courses were begun and plans were made for continuation and expansion of these activities. Pilot training programs for training RVNAF personnel to plan and conduct training R&D were established. Plans for off-shore training of RVNAF personnel were developed.

d. FY 73 Projection. An advisor will continue to serve the Director of MACT. Activities initiated in FY 71 and FY 72 by MACT/OTRD, CTC will continue and be expanded. These will include:
   (1) Expansion of in-country training of RVNAF personnel in systems engineering and in training management and evaluation.
   (2) Expansion of systems engineering of specific training courses in the RVNAF schools as trained personnel become available.
   (3) Continuation of the translation of appropriate training R&D documents selected from the available training R&D literature, both military and civilian.
   (4) Implementation of initial enrollment of RVNAF personnel in a multi-year off-shore training program.

5. Estimated Professional Man-Years Required:

   FY 73: 1.0
   FY 74: To be determined.

6. Interested Agencies:

   Office of the Deputy Chief of Staff for Personnel, Department of the Army
   Office of the Assistant Chief of Staff for Force Development, Department of the Army
   U.S. Continental Army Command
   U.S. Army Combat Developments Command
   Advanced Research Projects Agency

7. Work Sub-Unit Forecast:

FY 73			
1	2	3	4
*PCADS	PCADS	PCADS	PCADS

WORK UNIT STATEMENT

1. Research Into Methods of Data Acquisition in Selected Social Problem Areas in the Military—MODE (Continuing)

2. Location: HumRRO Division No. 7 (Social Science)

3. Technological Base Program

4. Scope:

   a. Objectives of Research. To develop, refine, and evaluate methods of collecting valid research data pertinent to critical social problem areas in the military (e.g., illicit drug use, race relations, dissent).

   b. Potential Military Research End-Result. Improved methods of data collection will enable Army authorities to obtain a more detailed and valid understanding of critical social problems and thus provide a sounder basis for effective ameliorative actions.

   c. Background and Summary. The military world, like the civilian world, is beset with critical social problems; growing illicit drug usage, racial disturbances on military posts, incidents of insubordination, and animosities between young low-ranking enlisted personnel and the more establishment oriented NCOs. Apparently, some of the VOLAR-inspired changes in Army rules, which were intended to make Army life more attractive, have the opposite effect on some individuals.

   Any attempts to obtain detailed information concerning men's attitudes and actions in these tension-fraught areas encounter serious difficulties because of such factors as (1) response falsification from fear of self-incrimination; (2) careless responding or nonresponding for various reasons, including attitudes toward military services; (3) failure of lower aptitude personnel to comprehend instructions.

   Research in this Work Unit will consist of methodological studies in the acquisition and analysis of data on social problem areas in the Army. These will include three Sub-Units.

   Sub-Unit I, Research on methods of data acquisition. In FY 72, a research study compared estimates of illicit drug usage rates derived from three types of anonymous "paper-and-pencil" data collection instruments. Two additional studies concerned the effects of mode of inquiry (questionnaire versus interview) and the effects the type of administrator had upon questionnaire data.

   Sub-Unit II, A comparison of drug usage rates as revealed by an anonymous questionnaire and by urinalysis. Urinalysis techniques are considered the most valid indicators of use of most of the principal drugs of abuse (exceptions are marijuana and the hallucinogens); however, use of these techniques is expensive and cumbersome. For research purposes, it would be highly desirable to replace them with an anonymous questionnaire, if this method could be shown to yield equally valid data or the relationship of the results of the two methods were known. In Sub-Unit II, groups of military subjects will be administered both a questionnaire and a urinalysis, and drug usage rates obtained by the two methods will be compared.

Sub-Unit III, Studies of carefulness in responding to survey inquiries. The validity of questionnaire information will be studied as a function of characteristics and Army experiences of respondents. The research will identify the types of individuals who are most likely to complete questionnaires carelessly. Degree of carefulness in responding will be assessed by means of an objective carefulness score that will be developed following methods already available. The results will make it possible to identify individual respondents who have provided invalid data so that, when feasible and appropriate, they can be followed up with more appropriate methods (e.g., interview) and also to identify, in advance, individuals who are unlikely to provide valid data via the questionnaire approach.

d. FY 73 Projection. Under Sub-Unit I, the two studies on research on methods of data acquisition will be completed. Under Sub-Unit II, drug usage rates obtained by questionnaire and by urinalysis will be compared. Under Sub-Unit III, studies of carefulness in responding to survey inquiries will be conducted.

5. Estimated Professional Man-Years Required:

FY 73: 3.0
FY 74: 1.0

6. Interested Agencies:

Office of the Surgeon General, Department of the Army
Judge Advocate General, Department of the Army
The Provost Marshal General, Department of the Army
Motivation and Training Laboratory, U.S. Army Manpower Resources Research and Development Center
Bureau of Narcotics and Dangerous Drugs, Department of Justice
Center for Studies of Narcotics and Drug Abuse, Department of Health, Education and Welfare

7. Work Sub-Unit Summary and Forecast:

I. Research on methods of data acquisition:

FY 73			
1	2	3	4
*C	AD	DS	

II. Comparison of questionnaire and urinalysis:

FY 73			
1	2	3	4
*P	C	AD	S

III. Studies of carefulness in responding to survey inquiries:

FY 73				FY 74			
1	2	3	4	1	2	3	4
	P	C	A	AD	S		

WORK UNIT STATEMENT

1. Model for Systems Engineering of Man-Ascendant Jobs—MODMAN (Continuing)

2. Location: HumRRO Division No. 5

3. Technological Base Program

4. Scope:

   a. Objective of Research. To develop and evaluate a practical model and procedure for systems engineering of non-routine (man-ascendant) command, supervision, and leadership functions at various levels of Army training, that is, basic and advanced officer and NCO courses.

   b. Potential Military Research End-Result. Four products should result:
      (1) A general prototype model that will provide a framework and approach to systems engineering of career-type courses.
      (2) Prototype procedures and processes for implementing systems engineering of career-type courses.
      (3) Test and evaluation of the prototype model and procedures within the command and staff departments of the Air Defense, Infantry, and Transportation School Advanced Officer courses (C-22). These three schools will ensure coverage of a full range of variables.
      (4) Procedural guides and an administrative manual that can be incorporated in (or added to) existing CONARC regulations on systems engineering. Emphasis will be on identifying job requirements, converting them to training objectives, and implementing related training methodology for general application in all CONARC career-type courses.

   c. Background and Summary. CONARC Regulation 350-100-1, *Systems Engineering of Training*, February 1968, presently being revised, established requirements for systems engineering of all CONARC school courses. The method outlined was adequate for procedural tasks primarily oriented toward machine-ascendant functions, but proved inadequate when applied to the analysis of non-routine or man-ascendant functions. Many of the tasks associated with leaders or supervisors are so broad and diverse that only general functions can be described. Specialized techniques and approaches are needed to establish procedures for developing such courses of instruction.

      A general questionnaire has been sent to all CONARC schools where man-ascendant or non-routine courses (for example, basic, advanced officer, and noncommissioned officer education system (NCOES)) are taught in order to define the extent and commonality of the problem from the point of view of the school.

   d. FY 73 Projection. The initial research and partial job model of Work Unit SKYGUARD I, Construction of a Job Model for the Air Defense Officer, will be further developed. Job requirements identified in that effort will be evaluated on a preliminary basis by review and critique from the CONARC schools. Those job functions (duties) that cut across almost all jobs or assignments and that have not been adequately analyzed, will be studied as to their suitability for training.

The developed job model will specify (1) broad job functions derived from appropriate system characteristics, (2) general behavioral science considerations appropriate to the analysis of each broad job function, and (3) information categories, sources, and collection procedures needed to explicate each broad job function.

For example, three broad functions performed by commanders—operational decision-making, management, and leadership—are set forth in DA Pamphlet 600-15, *Leadership at Senior Levels of Command*, October 1968. The proposed analysis will deal with such broad functions as they apply to various real-life situations in which an officer would find himself, irrespective of future job assignments. In general, such a hierarchical model would list all subordinate skills that comprise any desired man-ascendant or non-routine job function.

As the prototype model is fully developed, instructional materials and methods will be developed for selected functions and tried out with C-22 officer students. Necessary procedures and techniques for effective implementation will be identified, defined, and tested. A behavioral approach will be used so that information fed into the training system will be consonant with procedures in CONARC Regulation 350-100-1. As time and support are made available, final testing and evaluation at various C-22 courses is anticipated.

5. Estimated Professional Man-Years Required:

   FY 73: 1.5

6. Interested Agencies:

   U.S. Continental Army Command
   U.S. Army War College
   U.S. Army Military Academy
   All U.S. Army Schools
   National War College

7. Work Sub-Unit Forecast:

	FY 73		
1	2	3	4
*CA	CA	D	S

WORK UNIT STATEMENT

1. Prediction of Training and Operational Performance of Army Aviators—PREDICT (Continuing)

2. Location: HumRRO Division No. 6 (Aviation)

3. Technological Base Program

4. Scope:

   a. Objective of Research. To develop operational systems for predicting performance of Army aviators during training and operational assignments by means of computerized multiple regression equations and probability tables.

   b. Potential Military Research End-Result. The products will be operational systems designed to enhance effectiveness and efficiency in making personnel decisions pertaining to Army aviator selection, training, and assignment. The result should be better utilization and management of the Army aviator—an important and costly Army manpower resource.

   c. Background and Summary. Army aviation managers can benefit from rapidly available summaries of data describing the relative potential of individuals and groups for important military performances, including (1) successful completion of training, (2) differential operational, transition, and advanced training assignments, (3) continuance in service after expiration of obligation, (4) avoidance of accidents, and (5) selection of instructors.

   Regression equations have been developed for predicting performance at each of seven points during preflight and primary helicopter flight training. These equations are currently in use, have been cross validated, and are being updated periodically. Efforts are being made to use these same equations for counseling and decision-making purposes. They currently furnish two types of predictions: (1) whether a given individual student will successfully complete the course, and (2) what his final end-of-course grade will be. The effort to develop equations to predict aviator gunnery performance has been deferred pending development by the Army of an adequate criterion measure of gunnery performance.

   Under PREDICT II, a peer-ranking form was sent to Vietnam for distribution among combat helicopter units. The data have been returned and are being collated. Criterion data gathered for PREDICT III, relating to the in-service retainability of Army aviators, were too badly distorted by the current reduction in force among Army aviators to be worth further analysis. All work on PREDICT III has been delayed until the current reduction in force is complete.

   Aviation accident research data have been furnished for PREDICT IV by the U.S. Army Agency for Aviation Safety (USAAAVS). They will be analyzed after a control group is obtained from administration of a questionnaire.
   All the data necessary for the establishment of predictive equations for instructor pilot selection (PREDICT V) have been gathered, and are being collated. This effort includes computation of equations to predict student performance at Fort Rucker.

   d. FY 73 Projection. PREDICT I is essentially complete; however, updating of the equations will be necessary. During FY 73, mechanisms for transferring

operational responsibility for PREDICT I to a U.S. Army unit will be studied, and the transfer will be started, giving the Army the responsibility for maintaining the PREDICT data file and for updating the PREDICT I equations. The information that the Army gathers will be used by HumRRO in continuing the other PREDICT Sub-units. In addition, HumRRO will assist the U.S. Army Primary Helicopter School in setting up a system for using the equations as a counseling tool.

The combat criterion study (PREDICT II) will be substantially completed during FY 73. No activity is contemplated for PREDICT III (Aviator Retention) for FY 73 because of the continuing effects of the reduction in force. The aviation safety information furnished for PREDICT IV by USAAAVS provides a source of data on individuals who have accidents; however, it does not include any data on individuals who do not have accidents. To provide such data, a questionnaire will be designed and distributed to a large population of aviators who have not had accidents, and who are represented in the PREDICT data file.

PREDICT V (Instructor Pilot Selection) will be completed as far as its current scope is concerned during FY 73, and equations allowing the prediction of instructor pilot performance will be supplied to the U.S. Army Aviation School for predicting instructor performance in the Basic Instruments, Advanced Instruments, and Contact Courses.

5. Estimated Professional Man-Years Required:

FY 73: 2.3
FY 74: 1.0

6. Interested Agencies:

Office of Personnel Operations, Department of the Army
U.S. Continental Army Command
U.S. Army Combat Developments Command
U.S. Army Agency for Aviation Safety
U.S. Army Aeromedical Research Laboratory
U.S. Army Behavior and Systems Research Laboratory
U.S. Army Human Engineering Laboratories
U.S. Army Medical Research Laboratory
U.S. Army Primary Helicopter School
U.S. Army Aerospace Medical Institute
U.S. Army Air Technical Training Command
U.S. Air Force Human Resources Laboratory
U.S. Air Force Aerospace Medical Research Laboratory
U.S. Air Force Air Training Command

7. Work Sub-Unit Summary and Forecast:

1. Development of systems for predicting performance in initial rotary wing training:

FY 73				FY 74			
1	2	3	4	1	2	3	4
*S	CA	CA	CA	CA	CA	D	S

II. Development of a system for predicting quality of combat performance:

	FY 73		
1	2	3	4
*AD	D	S	

III. Development of a system for predicting retainability of Army aviators: Suspended.

IV. Relation of selection and training data to Army aviation flight safety:

	FY 73		
1	2	3	4
*C	CA	AD	DS

V. Predicting performance of instructor pilots:

	FY 73		
1	2	3	4
*A	D	D	S

VI. Refinement of operational prediction systems: As necessary.

WORK UNIT STATEMENT

1. Procedures for Individualized-Instruction System Management—PRISM (New)

2. Location: HumRRO Division No. 1 (System Operations)

3. Technological Base Program

4. Scope:

   a. Objective of Research. To develop and validate training management techniques that will permit the efficient and effective operation of individualized, variable-length training programs.

   b. Potential Military Research End-Result. Research in this area should provide information that will enable the Army to:
      (1) Effectively manage and schedule training resources to accommodate differences in student progress in a self-paced instructional setting.
      (2) Obtain the benefit of variable-length training efficiency by the use of a system for accurate prediction of course completion time that fits personnel assignment requirements.
      (3) Obtain an optimum learning effort from each student by the implementation of an incentive program that is based upon individual learning rate estimates.

   c. Background. In recent years, the military classroom has been the scene of an increasing effort to incorporate instructional programs that respond to the needs of the individual trainee. Modern training technology has developed such methods (e.g., programed instruction, computer-assisted instruction, which, in general, provide a more efficient approach to training without sacrificing effectiveness.

      Such efficiency (typically a savings of 30% in training time) comes about as a result of the characteristic of student self-pacing. However, this factor also creates managerial problems because of differences in rates of student progress not found in traditional lock-step programs.

      In a previous HumRRO effort (STOCK), the U.S. Army Quartermaster School (QMS) selected the Stock Control and Accounting Specialist course for individualization and as a research vehicle for the study. Managerial difficulties and problems that arise when a variable-length, entry-MOS training program is to be implemented, were identified. Several techniques were suggested as possible solutions to these problems. For example, training mangers who intend to implement an individualized course that utilizes large quantities of instructional materials and extensive training facilities, and is to be provided to several thousand students during the year, must have information that permits reliable and accurate planning. General Purpose Simulation System (GPSS) simulations of personnel flow through variable-length training programs were suggested as a means for aiding the training manager to solve these problems.

      Another requirement deemed essential for implementing an individualized training program is a system for accurately predicting each student's course completion time. This would permit the timely reporting of assignment information and the efficient utilization of course graduates. A predictive test battery was designed and partially developed under Work Unit STOCK. Its validation

and incorporation in a predictive system await completion of a total individualized 76P20 course. The approach that was used assumes the following: (1) (1) Content-related tests are better predictors of course completion time than general aptitude measures; (2) a linear predictive function is the "best" description of the relationship between predictors and criteria. Evidence to support the first of these hypotheses was obtained, but no useful predictive equation could be developed and evaluated until the individualized course is completed. Completion of this course (76P20) should occur by mid-FY 1973.

The rate at which an individual progresses through an instructional program is a function of a multitude of factors, one set of which can be labeled "motivational." Some training programs attempt to identify the course completion time of a student by establishing an incentive system that "directs" the student to finish on a given date. In a truly individualized program, however, it is preferable that the student set, within limits, the learning pace that he finds most comfortable and productive. Only after his completion time is predicted on the basis of motivational and other "intrinsic" factors should an "extrinsic" reward system be introduced. Its purpose would be to slightly alter his learning rate, *if necessary*, to reduce errors in prediction. This type of incentive system should lead to nearly optimum learning rates for all students and should be reflected in improved student performance.

d. Method of Attack. GPSS simulations will be evaluated as a training management tool in an operational individualized training program. The capability of this technique as an accurate forecast of student scheduling and training resource requirements will be examined. Projections of training load, daily student output, optimum follow-on course-scheduling policies, and so forth will be compared with the data obtained from the operational 76P20 course.

A system for predicting course completion time will be developed and tested. In addition to the development of predictor tests that are representative of all sections of the 76P20 course, an attempt will be made to verify the assumptions underlying the approach used to develop the predictive functions. A technique also will be developed for displaying the predictive information in a way that will be useful to personnel/training managers.

An extrinsic incentive system will be developed to supplement the prediction system and reduce its errors when required. The problems of implementing this system will be documented along with a description of the effects of the incentives upon learning rates, prediction errors, and performance.

5. Estimated Professional Man-Years Required:

FY 73: 2.0

6. Interested Agencies:

Office of the Deputy Chief of Staff for Personnel, Department of the Army
Office of Personnel Operations, Department of the Army
U.S. Continental Army Command Schools and Training Centers
U.S. Army Quartermaster School

7. Work Sub-Unit Forecast:

FY 73

1	2	3	4
PCA	CA	CAD	DS

WORK UNIT STATEMENT

1. Developing Criteria for the Selection of Methods and Media by Army Trainers—SMMART (Continuing)

2. Location: HumRRO Division No. 2

3. Applied Program. Sponsor: U.S. Continental Army Command

4. Scope:

   a. Objective of Research. To provide Army trainers with a manual for making an optimal selection of training methods and media.

   b. Potential Military Research End-Result. The results of this research should provide:
      (1) A current state-of-knowledge document for Army trainers to use in selecting methods and media.
      (2) An empirically based program plan establishing the scope and priority of research designed to provide a basis for optimal methods and media selection.
      (3) A final body of knowledge that will enable the Army trainer to select optimal methods and media for achieving training objectives.

   c. Background and Summary. HumRRO Exploratory Research 75, Methodology for Training Systems Engineering, indicate that few empirical data are available on the relative effectiveness and cost of various training methods and media, and no system is available to specify relevant criteria for determining effectiveness and relating to training objectives. Thus, selection of methods and media must be based primarily upon the trial-and-error experience of the trainer. Because of the increasing complexity and cost of training requirements and experiments, a procedure is needed to enable the Army trainer to identify and select the most effective methods and media for a given training requirement. Usable criteria of optimal effectiveness and cost need to be delineated, and the relative payoffs of possible methods and media need to be empirically determined.

      Based upon a state-of-the-art documentation, a research plan was developed to provide a body of knowledge for methods and media selection. The research will be directed toward two areas that require additional empirical data. The first is concerned with determining the optimal training method for a particular teaching point (CON Reg. 350-100-1: Appendix D specifies conversion of teaching points to training methods); the results of SMMART I stated the current level of knowledge as to characteristics of teaching points and their relationship to training method relevance. The second research area concerns the selection of cost-effective media for use with each training method; SMMART I provided a current inventory of media types, the characteristics each can provide, and the cost factors related to the use of each type. Cost factors were also synthesized into four models, one for use at each decision-making level.

   d. FY 73 Projection. A sample of Army lesson plans will be used to derive additional teaching points, characteristics, and the relationships of the additional characteristics to training methods will be derived from the literature. An empirical framework will be developed to group characteristics according to common relationships with training methods, and the framework will be field tested so that characteristics can be stated in the language of the Army instructor. In addition, each

cost model will be related to the procedures and cost factors that can be used by Army instructors and then field tested with a selected sample of Army courses.

5. Estimated Professional Man-Years Required:

FY 73: 2.0
FY 74: 2.0

6. Interested Agencies:

Office of the Deputy Chief of Staff for Personnel, Department of the Army
U.S. Army Training Device Agency
U.S. Army Schools and Training Centers

7. Work Sub-Unit Summary and Forecast:

I. Development of a research plan: Completed.

II. Selection of training methods:

FY 73				FY 74			
1	2	3	4	1	2	3	4
*CA	CA	CA	PADS	PC	CA	CA	ADS

III. Development and field test of cost models for media selection:

FY 73				FY 74			
1	2	3	4	1	2	3	4
P	PC	CA	AP	PC	CA	D	S

WORK UNIT STATEMENT

1. Support of the Army's Field Experimentation in Service Attractiveness and Training Programs—VOLAR EVALUATION (Continuing)

2. Location: HumRRO Division No. 3

3. Applied Program Sponsor: Special Assistant for the Modern Volunteer Army (SAMVA)

4. Scope:

   a. Objective of Research. To provide research and development effort in support of field experimental activities being conducted by the Special Assistant for the Modern Volunteer Army.

   b. Potential Military Research End-Result. The major products of this research are analytic evaluations of Modern Volunteer Army (MVA) innovations throughout the Army and VOLAR innovations at selected locations in Continental United States (CONUS) and in the Army in Europe (USAREUR).

   c. Background and Summary. Five questionnaire studies of MVA and VOLAR innovations were conducted during 1971: (1) a longitudinal study of all men sent to Fort Ord and Fort Jackson for Basic Training between January and July 1971; (2) a retrospective study of the background characteristics and the perceptions of Army conditions of those men who go AWOL while still in training; (3) a recursive study of permanent party personnel, officers and enlisted men, at Forts Ord, Jackson, Carson, Benning, and Knox and special samples at Fort Bragg and in USAREUR; (4) a comparative study of the reenlistment intentions expressed by the permanent party personnel and any actual reenlistment or separation action they may have taken during February, March, and April 1971; (5) a statistical study of a questionnaire administered to an approximate 1% worldwide sample of officers and enlisted men.

   Study findings were presented to SAMVA in a series of reports beginning in November 1971, including a summary report describing the major findings of the HumRRO studies and of installation studies (Forts Benning, Bragg, Carson, and Ord) conducted in 1971.

   A new questionnaire was developed for use by the Army in its evaluation of the VOLAR FY 72 program at 16 locations. During FY 72, these questionnaires were administered to persons levied to Europe from FY 71 VOLAR installations and training graduates from Fort Ord and Fort Jackson assigned to Europe and Forts Benning, Bragg, and Carson.

   d. FY 73 Projection. Report preparation for the FY 71 studies and data analysis and report preparation for the FY-72 follow-up studies will be completed.

5. Estimated Professional Man-Years Required:

   FY 73: 0.2

6. Interested Agencies:

   Office of the Assistant Secretary of the Army (Manpower and Reserve Affairs)
   Office of the Deputy Chief of Staff for Personnel, Department of the Army
   U.S. Continental Army Command

7. Work Sub-Unit Summary and Forecast:

   1. Evaluation of MVA and VOLAR innovations:

	FY 73			
	1	2	3	4
*ADS				

EXPLORATORY RESEARCH

1. Strategic Communications Personnel and Training Requirements—ER-93 (New)

2. Location: HumRRO Division No. 1 (System Operations)

3. Applied Program. Sponsor: U.S. Army Strategic Communications Command

4. Scope:

   a. Objective of Research. To evaluate personnel and training requirements data being prepared for Satellite Communications (SATCOM), Phase II Integrated Logistics Support (ILS), and Heavy Terminal (HT) test and evaluation; to study problems of enlisted career progression, training, and personnel policies within STRATCOM fixed-station organization; and to evaluate for the Army Telecommunication Automation Program (ATCAP): (1) personnel management system, (2) personnel selection system criteria, (3) Contractor-prepared personnel training requirements, and (4) the means for providing well-trained personnel to operate, maintain, and control the system.

   b. Military Problem. The present satellite communication system is essentially an R&D model that went into limited production. Improvements are currently being made to the present system (Phase II). STRATCOM has required that human factors be addressed in this improvement by specifying that quantitative, qualitative, personnel requirements information (QQPRI), human factors engineering (HFE), and personnel training information (PTI) data be obtained as part of the overall improvement procurement.

      It is of particular importance to ensure that human factors data collected through contract effort by the Integrated Logistics Support (ILS) contractor are sufficient to meet the military requirements for personnel manning, and for the development of technical training programs. The procurement and installation of a Heavy Terminal (HT) is one aspect of the Phase II program; since a military training program will be developed to maintain and operate this equipment, personnel and training matters need to be studied during the test and evaluation phase.

      In the past, for lack of sufficient planning information ATCAP has resulted in deficiencies in personnel selection and training and in the determination of man-material interface characteristics. To provide adequate planning information, these matters need to be studied.

   c. Approach. With respect to the satellite ILS and HT problems, the role will be to support the contracting officer's representative, and to interact with the ILS contractor. Documents and specifications that prescribe personnel and training planning actions will be evaluated. Because of decisions yet to be made by the Army and the contractor for ILS and HT, the schedule for interaction remains to be defined.

      With regard to ATCAP, an existing automated telecommunication system, such as PTC (Pentagon Telecommunication Center) will be studied to acquire data on the manning of such an installation, and to evaluate the QQPRI, Task and Skills Analysis, and PTI for ATCAP.

5. Estimated Professional Man-Years Required:

FY 73: 1.5 (ATCAP and ILS may be separated at a later date)
FY 74: 2.0

6. Interested Agencies:

Satellite Communications Agency
U.S. Army Signal School and Center
Defense Communications Agency

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